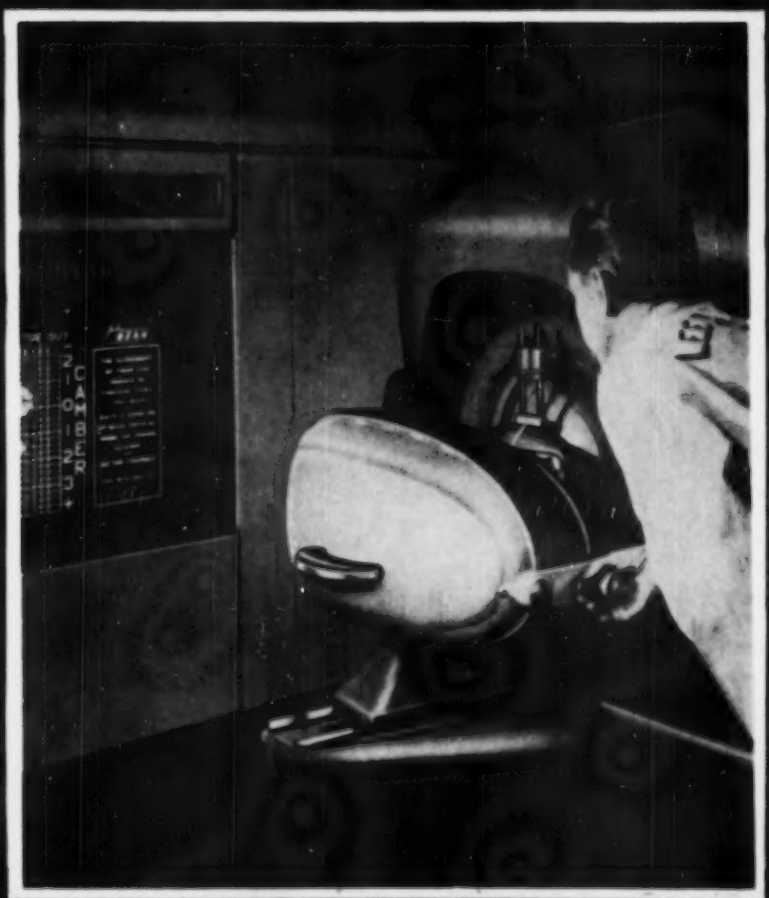
DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION



THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS

produced by Monarch's exclusive VELVAGLAZE process prove the advantages of VELVAGLAZE in many outstanding products.

Get all the facts! Send for Monarch's "Good News for Design and Product Engineers."

VELVAGLAZE

MAKES SALES!

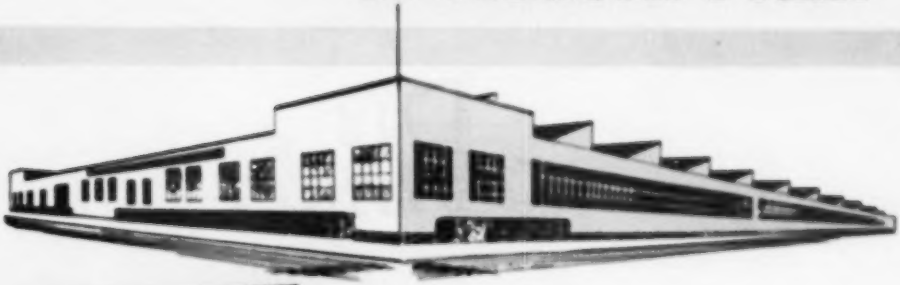
produced by Monarch's exclusive VELVAGLAZE process reduce production costs by eliminating costly finishing operations in customers' plants. Velvaglazed die castings can be shipped ready for installation or assembly operations.

Get all the facts! Send for Monarch's "Here's How to Cut Die Castings Finishing Costs."

Contact the Monarchman in your vicinity for a personal discussion of VELVAGLAZE in relation to your own product.

MONARCH ALUMINUM MFG. COMPANY, Detroit Avenue at West 93rd Street, Cleveland 2, Ohio

Over 80,000 Square Feet of Modern Plant



PARAGON DIE CASTINGS are all the name implies—excellent in structure—outstanding in appearance—unsurpassed in design.

Our modern plant has every facility for precision workmanship that reduces assembly and machining costs to an absolute minimum.

Z

PARAGON

ALUMINUM AND ZINC BASE DIE CASTINGS

Consult any of the offices listed below or write us direct for information on how to increase the salability of your product by die casting.

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PARAGON DIE CASTING COMPANY

5853 WEST DICKENS AVENUE CHICAGO 39, ILLINOIS

SALES OFFICES: DETROIT • INDIANAPOLIS • MILWAUKEE • CHICAGO

OCTOBER 1950
Vol. 8 No. 10

DIE CASTINGS

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COVER—When production costs can be cut from 25 to 33 percent by switching from sand cast aluminum to die cast aluminum (even though production quantities are about 1000 units per year), it is apparent that tool amortization for the die casting process is no problem. That has been the experience of the John Bean Div. who build auto wheel aligning equipment. Article on page 44.

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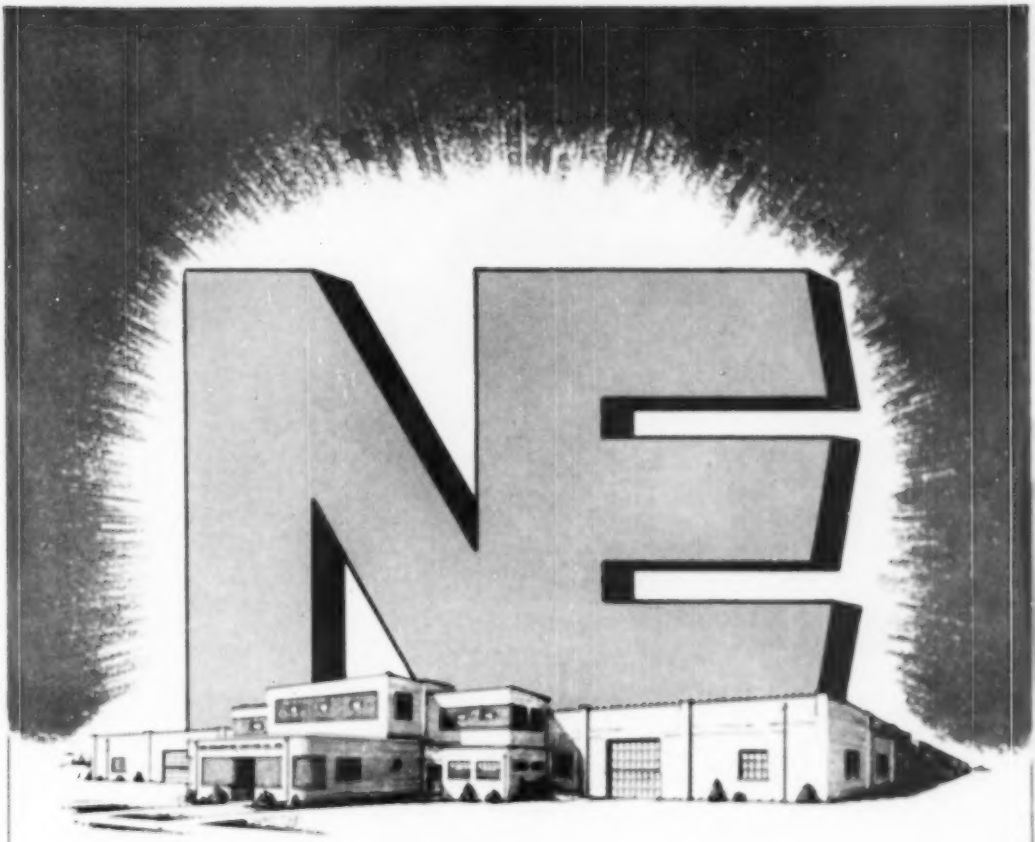


ZINC AND ALUMINUM
DIE CASTINGS

- The largest and most modern equipped die casting plant in the New Englcnd States.

Chas. W. Ohse
President

THE NEW ENGLAND DIE CASTING CO.
445 FRONT AVENUE · WEST HAVEN, CONNECTICUT

about buying
DIE CASTINGS

SERVICE—Your die casting supplier must have the facilities for prompt shipment of finished castings, combined with a service organization to give you immediate consultation on design or production problems.

QUALITY—Your die casting supplier must have complete quality control from raw ingot to finished product to assure "on grade" castings at all times.

FLEXIBILITY—Your die casting supplier must have the ability to produce every type and size of casting in either zinc or aluminum alloys.

ECONOMY—Your die casting supplier must have the engineering experience and production know-how to produce quality die castings at the least possible cost.

Here at Newton-New Haven we have all of these. Are you getting the most from your present arrangement? You must make a comparison before you can know. Ask the Newton-New Haven representative nearest you or write us.

Newton-New Haven, as an additional service to users of die castings has prepared a booklet on "How to Dimension Prints for Die Castings" Write on your company letterhead for your copy

NEWTON NEW HAVEN

THE NEWTON-NEW HAVEN COMPANY
689 THIRD AVENUE
WEST HAVEN 16, CONNECTICUT

LETTERS TO THE Editor

BLACK ANODIC FINISH

The Ansco Abstracts called attention to the article "Black Anodic Finish for Die Cast Aluminum" in the April, 1950, issue of your magazine. We would like a reprint of the article or else a copy of your magazine containing this article.

This is a copy of the article which describes the methods used by Fairchild Camera and Instrument Corporation to obtain a satisfactory black anodic finish on high silicon aluminum alloy.—T. A. W.

Tear sheets sent.—Ed.

SMALL BRASS DIE CASTINGS

We are looking for a source of small brass die castings preferably in the middlewest. We would appreciate it very much if you could give us a list of companies who can produce small brass die castings.—J.H. H.

List forwarded.—Ed.

ALLOYING CHROME WITH DIE STEEL

In the April, 1949 issue of Die Castings Magazine you had an article by Mr. A. Berger about the alloying of chrome with die casting dies.

This article mentions Diffusion Alloys Corporation, New York, as having the exclusive rights for doing this work and I wish to get their address. Could you furnish me with same. —S.M.

Address of Diffusion Alloys Corp. is 109 West 64 Street, New York, N.Y.—Ed.

CORRECTING UNBALANCE

We have tried without success to locate a copy of an article, "Correction of Unbalance in Rotating Parts," which appeared on Pages 48 and 58 in the January, 1949 issue of Die Castings. If you have an extra copy we would appreciate receiving it.—F.D.G.

Copy forwarded.—Ed.

Die castings
by Pressure

Photo Courtesy of Cuyahoga Industries

A GREER ACCUMULATOR SAVED COST AND FLOOR SPACE IMPROVED EFFICIENCY OF DIE CASTING MACHINE

MR. J. L. LOVE, *President*
Cuyahoga Industries
Cleveland, Ohio:

"Our prime objective in designing this new Wedgelock Die Casting Machine was to put out a quality unit at a fair price. Every feature was carefully tailored to fit the needs of the die casting industry for a unit that incorporated everything possible to make it safe, practical, economical and positive locking with ease of die adjustment. The Greer Accumulator was chosen as one of the main quality parts which helped us attain our objective."

"The Greer Accumulator permitted us to use a 15 h.p. motor instead of one of 45 h.p., providing a saving in original cost and 32 sq. ft. of floor space. In addition, the accumulator stopped excessive heating of system oil and eliminated hazardous sludge in the tank."

This is but one of numerous applications where Greer Accumulators are reducing operating cost and improving safety and efficiency of equipment and machines.

We at Greer are eager to discuss your particular hydraulic power requirements. Our Bulletin 300 describes in detail the construction and uses of Greer Accumulators. Write for your copy on your company letterhead.

Sales Representatives in all principal cities.

YOUR SYMBOL OF SERVICE

GREER

HYDRAULICS INC.

454 EIGHTEENTH ST., BROOKLYN 15, N. Y.

LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

A-1. AMERICAN DIE CASTING INSTITUTE. The Certified Zinc Alloy Plan which assures users of "on grade" alloys is explained in a bulletin issued by American Die Casting Institute. The bulletin explains the methods of testing the purity of zinc alloys used by the die casters who are licensed to use the Institute's quality certification seal.

A-2. GRIES REPRODUCER Co. Besides offering bulletins on its production facilities in the field of small zinc alloy die castings, Gries Reproducer offers samples of its work. This company specializes in the production of tiny die castings.

A-3. MONARCH ALUMINUM MFG. CO. The company's new Velvaglaze process that helps solve casting problems is described in two booklets offered by the company. The first is "Here's how you can cut die casting finishing costs" while the second is "Good news for design and product engineers."

A-4. PARKER WHITE-METAL CO. The company offers a book on its facilities in the aluminum and zinc die casting fields.

A-5. E. M. SCOTT CHEMICAL CO. Samples of No Weld, a die lubricant concentrate compounded for aluminum die casting, are available.

A-6. STROMAN FURNACE AND ENGINEERING. Full information is available on the company's Model "DS" reverberatory furnace for melting and holding aluminum.

A-7. ACROMARK COMPANY. Literature is presented on hand and motor driven models of the Acroprinter, a machine for filling recessed letters and designs on die cast parts with enamel.

A-8. ALLIED RESEARCH PRODUCTS, INC. This company offers samples and free processing of parts with a new aluminum finish, Iridite Al-Coat, that offers a durable, nonporous film for aluminum products with a single cold process dip.

A-9. ALMCO DIVISION, QUEEN STOVE WORKS, INC. Almco Supershoen barrel tumbling equipment is described in a folder now available. Also offered is information on Supershoen Engineering Clinics, a nationwide network of engineering clinics that offer sample processing.

(Continued on Page 10)

DIE CASTINGS

BY

Stewart

40 YEARS OF SERVICE TO INDUSTRY

METALLURGICAL CONTROL

Manufacturers cannot afford to jeopardize the performance of their products by using die castings of dubious metallurgical quality. Our trained technicians, aided by complete scientific laboratory equipment, continuously supervise exacting controls protecting the high metallurgical standard inherent in Stewart products.

Services available to you at Stewart's

- Designing
- Engineering
- Die Making
- Metallurgical Control
- Most modern Die Casting Equipment
- Complete machining, polishing and assembly facilities

We invite inquiries concerning all Die Casting problems.

STEWART DIE CASTING
Division of Stewart-Warner Corporation
4939 Fullerton Avenue, Chicago 39, Illinois
36 Austin Street, Bridgeport, Connecticut

We take pride in being known by the customers we keep

300 Brinell

Speed-Cut

- FOR PLASTIC MOLD PLATES AND CAVITIES
- FOR WHITE METAL CASTING DIES
- FOR BRAKE DIES • BENDING DIES • FORMING ROLLS

Furnished treated ready for use. SPEED-CUT machines as readily as ordinary die steels that have been fully annealed . . . stops "sinking" in plastic molds . . . eliminates treating worries in casting dies . . . provides longer wear life in brake dies, forming rolls, etc.

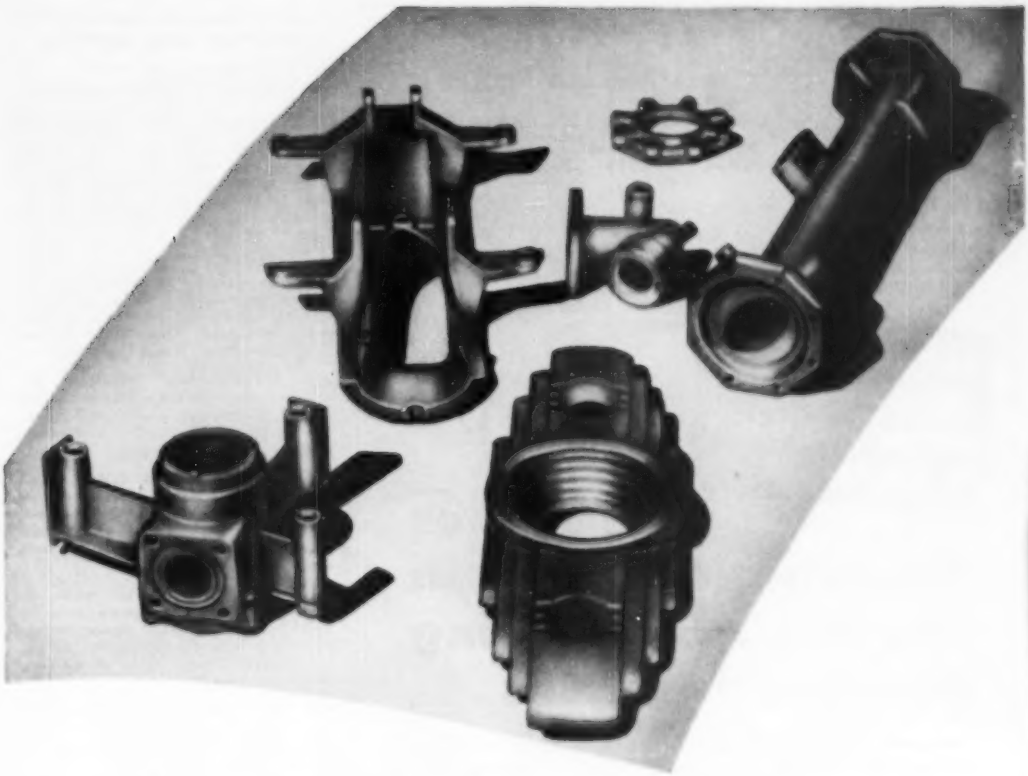
SPEED-CUT has high strength—high toughness—high wear resistance. Let us give you the details on how this unique steel will make money for you.

Also available annealed.

Vanadium-Alloys Steel Company

LATROBE, PA.

COLONIAL STEEL DIVISION – ANCHOR DRAWN STEEL CO.



The Results of a Recent Meeting!

Recently a leading gasoline pump manufacturer came to Parker with an intricate part problem. Our engineers consulted with him and together worked out the correct design and best material alloy for the job. An economical production run was set up at a worthwhile unit saving.

Shown above are the six Parker die cast parts for one assembly.

It pays to consult with Parker early in the development of die cast parts.

Write for our book on Parker facilities. Send us your blueprints.

PARKER WHITE-METAL CO. • 2144 McKINLEY AVENUE • ERIE, PENNSYLVANIA

R. T. BLOOMQUIST, Bellefonte, Penna. . . . O. J. BERGER, Room 1415, 139 N. Clark Street, Chicago 2, Ill. . . . O. H. BROXTERMAN, 1499 Elm Street, Cincinnati, Ohio . . . T. W. JOHNSON, Hillside Road, 7 Hills Village, Cleveland, Ohio . . . VAN ARSDELL & HODGSON, 930 Maccabees Bldg., Detroit 11, Mich. . . . G. L. PALMER, 97 Spring St., Metuchen, N. J. . . . J. C. PALMER, 3577 Monroe Ave., Pittsford, N. Y. . . . H. R. LaMONTAGNE, P. O. Box 969, Springfield, Mass. . . . EDWARD F. HIGGINS, Jr., 4931 Lafayette Avenue, St. Louis, Missouri.

PARKER ALUMINUM *and* ZINC *Die Castings*

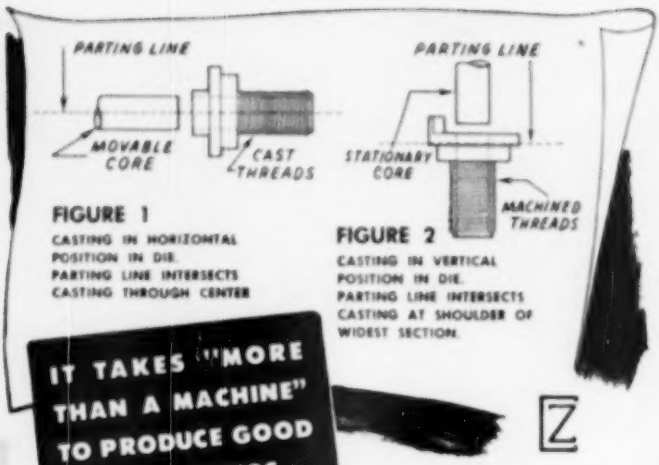


FIGURE 1
CASTING IN HORIZONTAL POSITION IN DIE. PARTING LINE INTERSECTS CASTING THROUGH CENTER

FIGURE 2
CASTING IN VERTICAL POSITION IN DIE. PARTING LINE INTERSECTS CASTING AT SHOULDER OF WIDEST SECTION.

IT TAKES "MORE THAN A MACHINE" TO PRODUCE GOOD DIE CASTINGS

it requires Consummate Skill in the Art of Designing Die-Casting Dies . . .

Designing a die to produce a certain casting can be a more difficult task than designing the part itself. Here are just a few of the problems which may confront the die designer:

1. **Should the cavity lie in a vertical or horizontal position for best results?**
2. **Where should the parting line be located to (a) expedite the casting operation; (b) to reduce subsequent operations; (c) to facilitate assembly?**
3. **Will movable cores or "slides" be necessary?**
4. **Are inserts required at any point for resistance to wear, or to increase strength?**
5. **How will position of die cavity affect density and grain structure of casting?**
6. **Will surface "chill" on exterior of casting, be "broken" by subsequent machining?**
7. **How will die design affect cost of the die and cost of finished castings?**

The skilled die designer *knows* how to find the answers to these and similar questions. His knowledge is gained through years of close association with this highly specialized industry . . . and is one of the basic reasons why it takes "more than a machine" to produce good die castings.

MILWAUKEE DIE CASTING COMPANY
1019 N. FOURTH STREET • MILWAUKEE 3, WISCONSIN

LITERATURE AND SERVICES

(Continued from Page 6)

A-10. BELLOWS COMPANY. Bulletins numbered CL-15, DF-105, and T-25 are available from this company. The bulletins cover mechanical tool and table feeding units manufactured by the company for the conversion of manually operated machine tools.

A-11. COWLES CHEMICAL CO. Two companion cleaners, SO Cleaner and ZN Cleaner, for removal of buffing compounds from die castings are described in a folder issued by Cowles. The folder is "Buffing Compound Removal Was a Tough Job."

A-12. DIVERSEY CORP. A cleaner, No. 505, that conditions the surface of zinc die castings prior to plating while removing unwanted deposits is described in literature available.

A-13. DULITE CHEMICAL CORP. An all purpose cleaner, No. 37, that cleans all metals except aluminum, and a cleaner, No. 31, that cleans steel and all ferrous metals, prior to plating is described by literature offered by the company.

A-14. ENTHONE, INC. The company offers literature on five cleaners, including Zinc Cleaner 20, an anodic cleaner for preparing zinc base die castings for plating; and Aluminum Cleaner NE, a non-tarnishing cleaner for aluminum.

A-15. MEAD SPECIALTIES CO. A complete catalog is offered by the company which includes information on a pneumatic drill press feed.

A-16. NEILSON CHEMICAL CO. Brochure 4998 explains how "Lyfonizing" aluminum products can provide resistance to salt spray and exposure to the atmosphere. A sample Lyfonized panel is also offered by the company.

A-17. OAKITE PRODUCTS, INC. "How to strip paint" is the title of a booklet available through the company. Covered in the booklet are such subjects as stripping metal parts in large volume, stripping metal parts too large to be soaked in tanks and what strippers are best for various types of finishes.

A-18. PANGBORN CORP. Bulletin 1400 from the company offers full information on Hydro-Finish, a process that removes heat-treat oxide discoloration from dies, as well as eliminating much hand buffing and polishing.

A-19. NIAGARA ALKALI CO. A pamphlet on the properties of NIALK TRICHLORethylene, a metal cleaning and degreasing agent is offered by the company.

A-20. ETTCO TOOL CO., INC., Bulletin No. 35, issued by the company, describes Ettco-Emrick Adjustable Spindle Multiple Heads. These heads, which can be attached to any make drill press, make multiple drilling and tapping operations possible at low initial costs.

A-21. PROCUNIER SAFETY CHUCK CO. A high speed tap head in which tap driving pressure is regulated by pressure applied to the friction clutch is described by a brochure issued by the company.

(Continued on Page 30)

East and Midwest,
2 modern
ALCOA PLANTS MAKE
the best
ALUMINUM DIE CASTINGS
you can buy

for example...

Westinghouse Air Brake Company can't hold production while they wait for die cast parts. Neither can you. Delays just don't happen to Alcoa customers if the best in personnel and facilities can prevent them.

Apply this Alcoa dependability to your own operation. Quotations? They'll be on your desk the day we promise 'em. Design help? Alcoa recommendations are based on 35 years in the die casting business. Deliveries—quality? We've built our reputation on both.

There's an Alcoa specialist near you . . . ready to give you a prompt quotation. Look under "aluminum" in your classified phone book. Or write ALUMINUM COMPANY OF AMERICA, 1895K Gulf Bldg., Pittsburgh 19, Pennsylvania.

ALCOA DIE CASTINGS

ALCOA ALUMINUM

Yes! IT'S EASY TO INSTALL RING *Automatic* SHOT CONTROL!

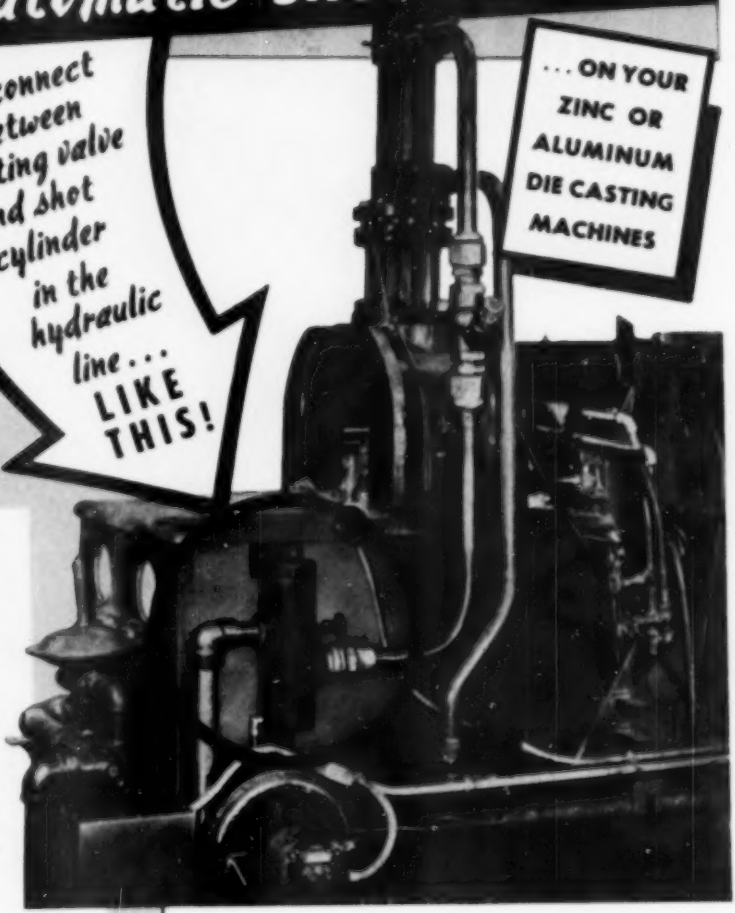
Just connect it between operating valve and shot cylinder in the hydraulic line... LIKE THIS!

MORE ACCEPTABLE CASTINGS AT LOWER COST

●

Better Surface! Better Structure!

...ON YOUR ZINC OR ALUMINUM DIE CASTING MACHINES



This Photo shows how easily the Ring Automatic Shot Control Unit can be installed on your die casting machine. This unit when installed controls your shot from 1" to full stroke at variable speeds. It permits metal to fill about ⅔ of die cavity before full line pressure is applied, allowing air to escape and producing a better casting with a superior structure and finish. Vibration and "pounding" on the machine are reduced, goose-necks last longer, you get more and better production at lower unit cost. Finishing costs are less due to better surface.

CIRCULAR ON REQUEST

Four page circular and data on this remarkable unit will be sent at once to engineers and executives interested in better die casting at lower costs. This information will interest you!

RING VALVE CO., Inc.

CLAWSON • MICH.

Telephone Lincoln 2-3387

RING VALVE CO.,
Clawson, Mich.

Gentlemen:

Please send descriptive circular and data on your Ring Automatic Shot Control Unit.

Name _____

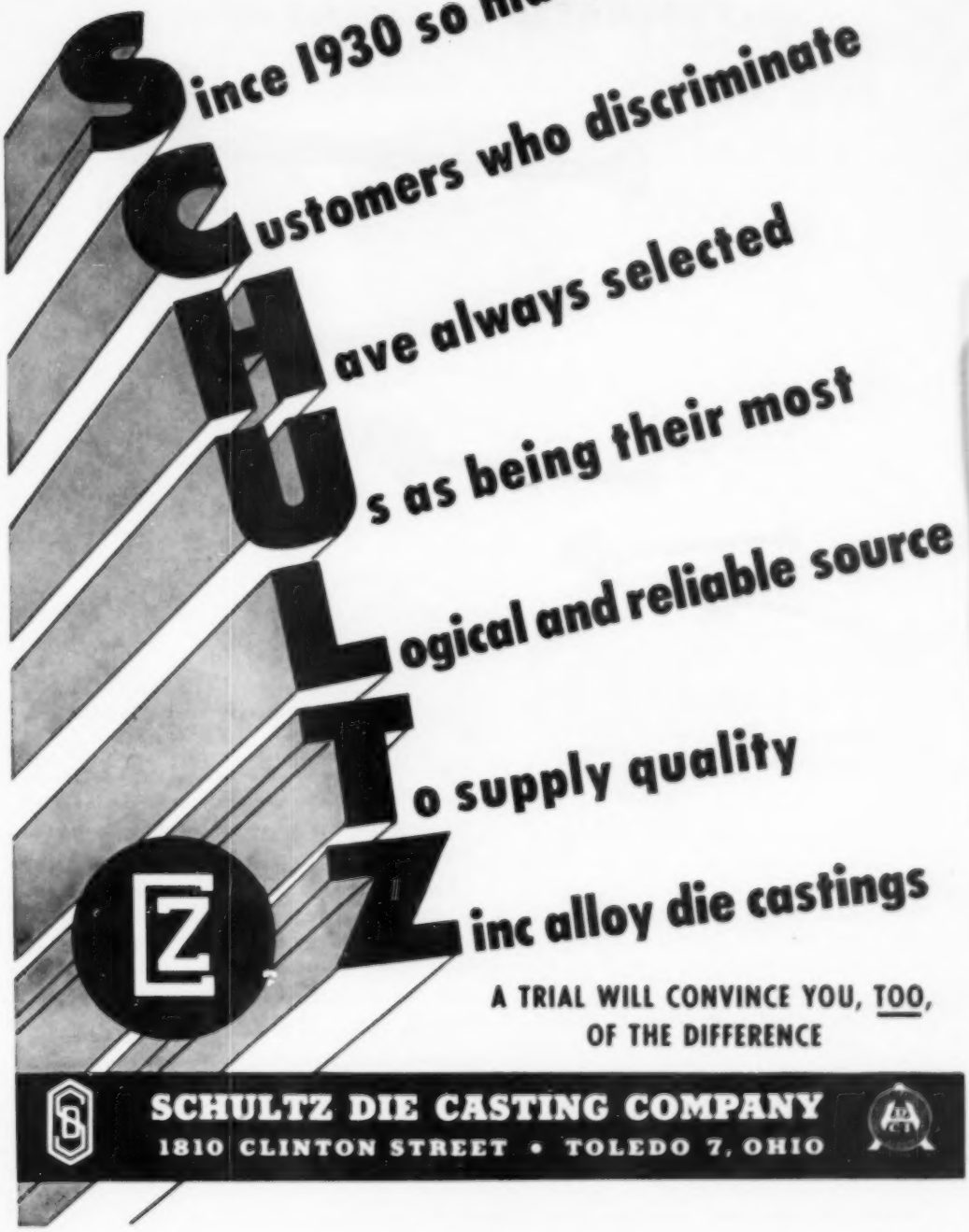
Title _____

Company _____

Street _____

City _____ Zone _____ State _____

THERE'S A REASON WHY



to be sure

the WELBILT STOVE COMPANY

uses FEDERATED DIE CASTING METAL

The Welbilt Stove Company, Inc., Maspeth, N. Y., is one of the world's leading manufacturers of popular price gas stoves.

Welbilt quality and volume demand that parts be consistently perfect. *To be sure* of this the burners in each of their thousands of ranges are die cast of a Federated aluminum alloy.

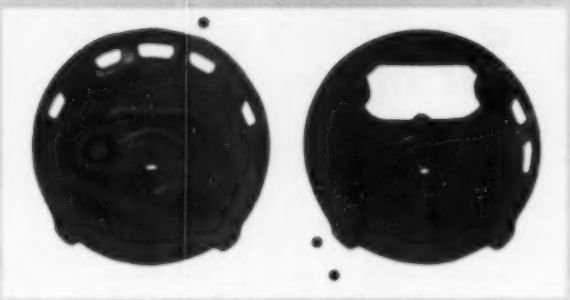
Federated aluminum-base die casting alloys are produced under strict metallurgical control . . . in accordance with ASTM, SAE, AMS, US Navy and US Army specifications . . . and are therefore guaranteed always to be of high purity and uniformity.

For die casting metals, or for help with die casting problems, see Federated first.

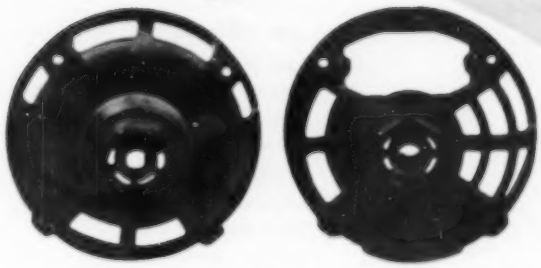
Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY · 120 BROADWAY, NEW YORK 5, N. Y.

HERE'S HOW Thompson DIE CASTINGS REDUCES LABOR AND MATERIAL COSTS 20%



Eleven machine tools were needed to drill, ream and bore these sand cast motor end frames due to wide variations in cast dimensions.



These die cast aluminum motor end frames are so accurate that all but three simple machining operations were eliminated to finish them.

• BY CHANGING from grey iron sand castings to Thompson aluminum die castings, *one* of the country's leading fractional h.p. motor manufacturers* reduced material and labor costs by 20 percent.

Important additional savings in packing and freight costs resulted from the switch to die castings since the weight of the motor end frames was reduced from nearly six pounds to little more than a pound and one half.

Take another look at your product! Perhaps you, too, can make important savings by the use of Thompson die castings. Write us about helping you plan any new parts that you may need and old ones you may wish redesigned.

*Name on file

Thompson Products, Inc.

2269 ASHLAND ROAD • • • CLEVELAND 3, OHIO

LIGHT METALS DIVISION

a cyclone was the hit of the show!

Back in '35 at the Amphitheatre in Chicago, Lindberg's CYCLONE Furnace was the hit of the show . . . because it brought to every heat treater a new and better way to do his job! The CYCLONE Furnace—our first product, was the first practical 100% forced convection furnace. It represents a basic improvement in existing equipment—it has never been successfully imitated.

Through the years we have grown in size and in the scope of the products we produce. We will have the products of eight divisions on display at this year's show—many of these products representing basic improvements in the tools of your trade.

on display:

HEAT TREATING FURNACES
MELTING FURNACES
HIGH FREQUENCY EQUIPMENT
ELECTRICAL EQUIPMENT
LABORATORY EQUIPMENT
AIR & HYDRAULIC EQUIPMENT
FABRICATION
AUTO ACCESSORIES

Be sure to see our exhibit – Booth # 1204 – National Metal Congress, Amphitheatre, Chicago, October 23—27, 1950

LINDBERG ENGINEERING COMPANY

2463 W. Hubbard Street • Chicago 12, Illinois

Is YOUR Supplier of Zinc Die Castings On This List?

A & A Die Cast and Plastic Molds Co., West Los Angeles, Calif.
The Accurate Die Casting Co., Cleveland, Ohio
Advance Pressure Castings, Inc., Brooklyn, N. Y.
Advance Tool & Die Casting Co., Milwaukee, Wis.

Badger Die Casting Co., Milwaukee, Wis.

Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Cleveland Hardware & Forging Co., Cleveland, Ohio
Congress Drives Division, Tann Corp., Detroit, Mich.
Continental Die Casting Corp., Detroit, Mich.
Division of F. L. Jacobs Co.
Crown City Die Casting Co., Pasadena, Calif.

Doehler-Jarvis Corp., Pottstown, Penna.
Doehler-Jarvis Corp., Toledo, Ohio
Doehler-Jarvis Corp., Chicago, Ill.
Dollin Corporation, Irvington, N. J.
Du-Wel Metal Products, Inc., Bangor, Mich.

Fanaro Manufacturing Co., Inc., Whittier, Calif.
Federal Die Casting Co., Chicago, Ill.

Glenvale Products Corporation, Detroit, Mich.
Globe Imperial Corporation, Rockford, Ill.
C. M. Gray Mfg. Co., East Orange, N. J.

Hoitt Die Casting Corporation, Chicago, Ill.
Hilfinger Corporation, Toledo, Ohio
The Hoover Company, North Canton, Ohio

Ironite Die Casting & Mfg. Co., Chicago, Ill.
Kiowa Corporation, Marshalltown, Iowa
Paul Krone Die Casting Co., Chicago, Ill.

Madison-Kipp Corporation, Madison, Wis.
Milwaukee Die Casting Co., Milwaukee, Wis.
Modern Die Casting Corp., Chicago, Ill.
Monarch Aluminum Mfg. Co., Cleveland, Ohio
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.

New Products Corp., Benton Harbor, Mich.

Paragon Die Casting Co., Chicago, Ill.
Parker White Metal Co., Erie, Penna.
Precision Castings Co., Inc., Syracuse, N. Y.
Precision Castings Co., Inc., Cleveland, Ohio
Precision Castings Co., Inc., Reed Metal
Crafts Division, Chicago, Ill.
Pressure Castings, Inc., Cleveland, Ohio

Racine Die Casting Co., Racine, Wis.

St. Louis Die Casting Corp., St. Louis, Mo.
Schultz Die Casting Co., Toledo, Ohio
Sterling Die Casting Co., Inc., Brooklyn, N. Y.
Stewart Die Casting Div. of Stewart Warner Corp., Bridgeport, Conn.
Stewart Die Casting Division of Stewart Warner Corp., Chicago, Ill.
Stroh Die Moulded Casting Co., Milwaukee, Wis.
Superior Die Casting Co., The, Cleveland, O.

The Tool-Die Engineering Co., Cleveland, Ohio
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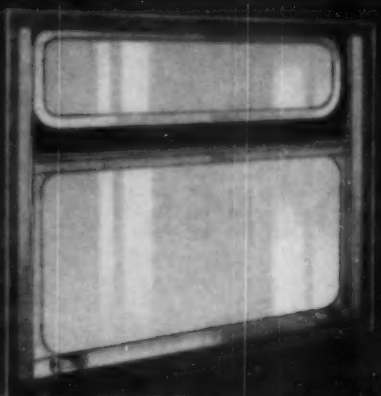

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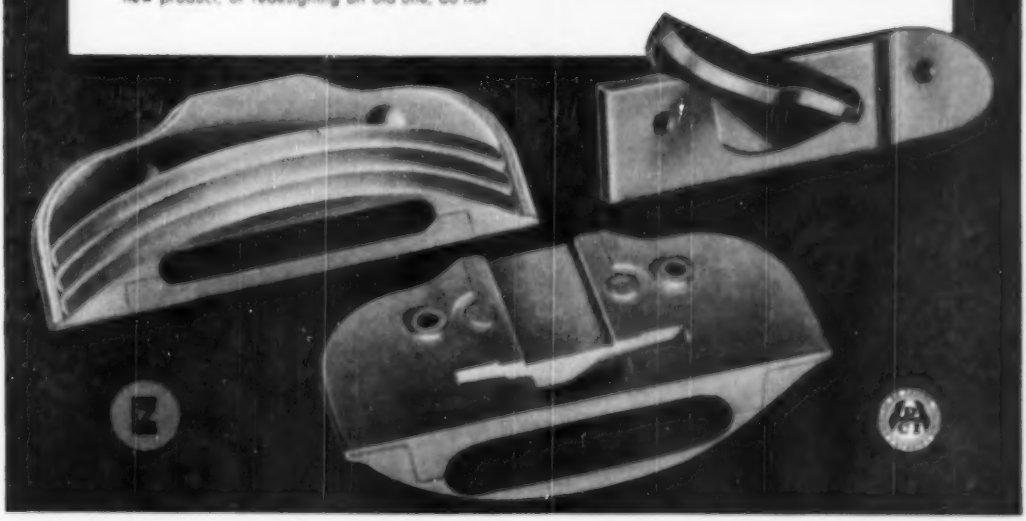

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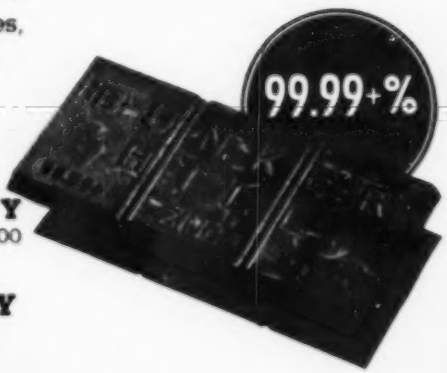

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Front view, dipping end

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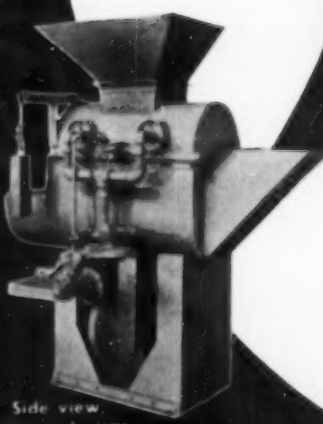
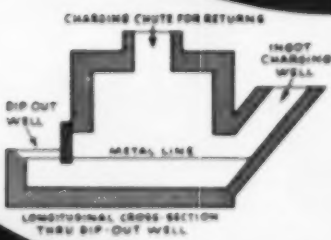


Side view showing burner



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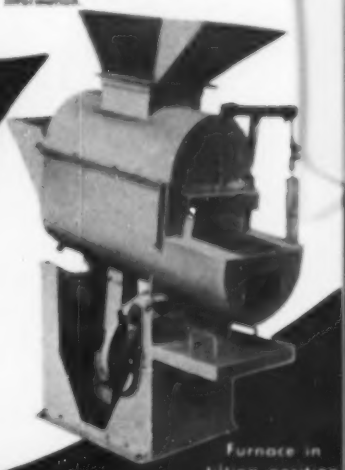

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DIE CAST HOUSINGS PERMIT FREQUENT DESIGN CHANGES

REMOTE control devices manufactured by the Barber-Colman Company of Rockford, Illinois, are subject to the special conditions of manufacturing characteristic of the aircraft industry for which they are designed.

Among the special conditions which affect the choice of materials and methods of fabrication are the frequent minor changes in design details, the relatively limited quantities in which any one model is produced, the rigid government specifications and the usual requirements of light weight and high strength.

To meet the manufacturing problem and yet remain within acceptable cost limits, Barber-Colman engineers have found it practical to employ aluminum alloy die castings for many of the housing components.

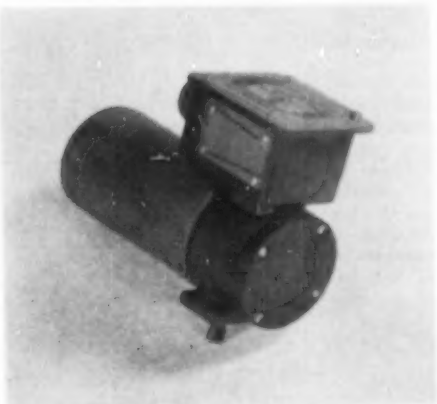
Remote control units such as the one shown in Figure 1 are essentially small, precision-built fractional horsepower motors with integral gear trains for speed reduction. The units are situated in many parts of the airplane and are controlled from the pilot's instrument panel to actuate various flight mechanisms.

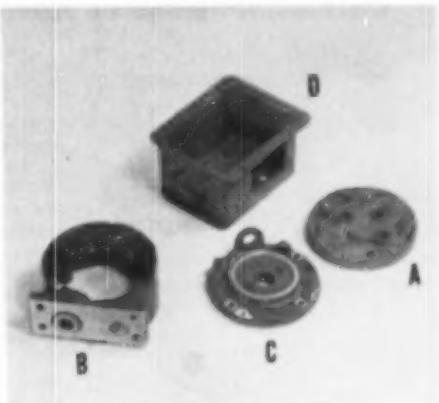
The alloy used for all of these die cast parts conforms to federal specifications QQ-A-591 and includes 9 per cent silicon and 3.5 per cent copper. All parts are anodized to increase their resistance to corrosion. A group of typical die castings is displayed in Figure 2.

Of particular interest is the way in which these components have been dimensioned. As can be seen by reference to the drawings, the specific requirements of the die casting process have been kept well in mind while laying in the dimensions.

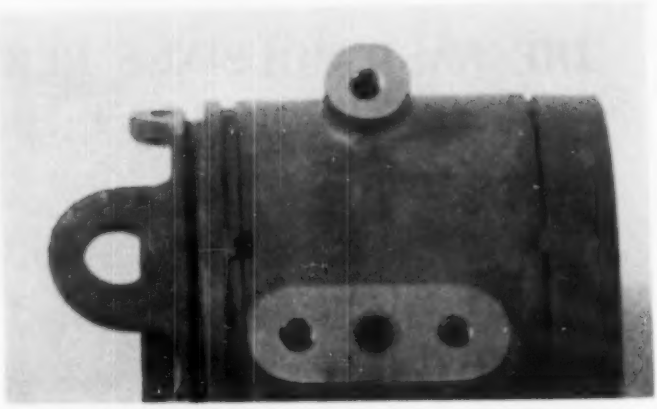
Dimensioning across the parting line. Dimensions which lie

1. FREQUENT DESIGN CHANGES in minor detail are characteristic of the small motors, below, produced by Barber-Colman for actuating aircraft remote controls.





2. BY MILLING OFF A FLANGE, changing the location or size of a drilled hole or some other secondary operation, the set of accurately dimensioned aluminum die castings, above, can be adapted to whatever design changes are required. (B) is the gear train housing with (A) and (C) the gear housing covers. (D) is the motor housing.



3. BY INCLUDING THE RABBET in the ejector half of the die which forms the interior details, it has been possible to include small lugs in the rabbet to locate this cover casting radially on the mating part. If the parting line were placed at the top edge, the rabbet would have to be milled, thus precluding any radial-locating lug.

4. RADIAL LOCATION of two gear housing covers is guaranteed by the use of small lugs, shown in detail, above right.

between the two halves of the die or between moving parts of the die, such as a slide or pull core, must have larger tolerances than those that are wholly in the solid portion of the die.

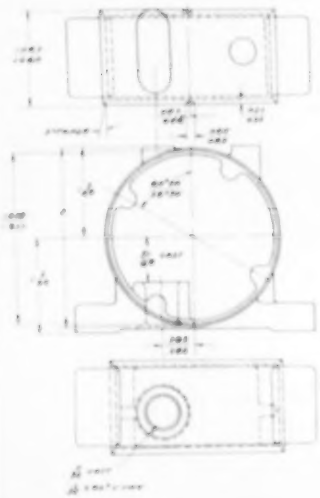
This is one of the important considerations in planning dimensional tolerances. As will be noticed in the drawing which is Figure 3, the die parting has not been placed along the inner surface of the casting, but along the shoulder .064/.066 below the surface.

This permits an unusually close tolerance of 1.937/1.938 on the diameter without any machining to secure a press fit between this casting and the gear train housing.

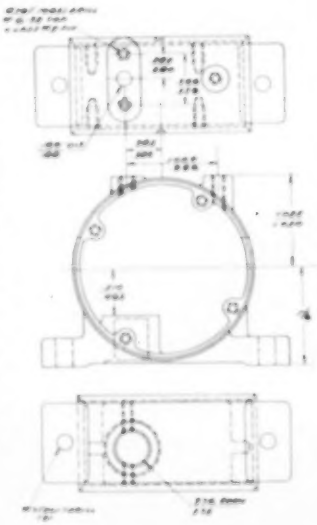
Placing the die parting along the shoulder also permits the introduction of a small key to mate with a slot in the gear train housing. Figure 4 is a

(Continued on Page 41)

Cast Dimensions vs Machined Dimensions



The difference between cast and machined dimensions is indicated by the casting drawing, left, and the machining drawing, right, of the same part. Note the 1.937/1.938 dimension which has been held in casting because it lies in a solid portion of the die, but the dimension of 1.060/1.065 has a greater tolerance because it lies across the die parting. Small holes, such as those shown at right, are too small for accurate casting. Also, elimination of these cored holes permits changes in size or location to fit changes in design. Larger holes, like the 11/32 hole, can be cast and then reamed to size.



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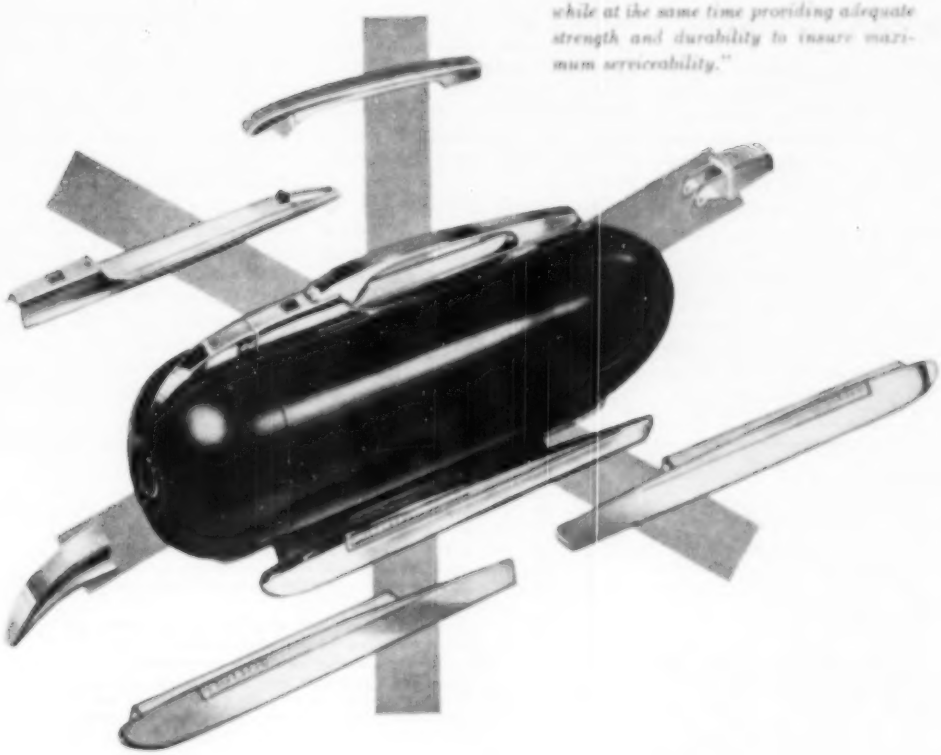

The sensational increase in the use of zinc base die castings in industry stems from the great superiority of method and material it affords for mass manufacture of high-quality products at low cost. Zinc of dependably correct characteristics is essential to these objectives. ANACONDA ELECTRIC® ZINC, 99.99+% pure, is always dependable. Anaconda Sales Company, 25 Broadway, New York 4, New York, Subsidiary of Anaconda Copper Mining Company.

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24 ways to avoid trouble in Die Casting Design

(PART TWO)

By HIRAM K. BARTON

TO the planning engineer, conversion to die castings means that such machining operations as may be required will be light and speedy, requiring only simple jigs and calling for a minimum of inter-process handling.

From the product designer's angle die castings demand attention not because they possess some one desirable quality to a pre-eminent degree, but because they combine many desirable properties in an all-round fashion. Most manufacturing methods have some spot-lighted advantage that sets them way ahead of die castings in one particular respect, but a study of the background often shows that there are concomitant disadvantages from which die casting is free.

Thus *sand castings* can be made of even more intricate form and with cored recesses of greater complexity than those possible in die castings, but although the form can be obtained the dimensional precision is lacking.

Metal stampings can be made in thinner sections than the thinnest shells that can be die cast, but for thicknesses of 0.020 in. or more a die casting can always be made more rigid than a steel stamping of the same thickness by reason of the stiffening ribs that can be incorporated.

Forgings have in most cases greater strength than equivalent die castings, can be produced with fairly intricate external form, but are not adapted to internal coring or to the holding of very close limits.

Impact extrusions may possess thinner and more accurately

FIGURE 9

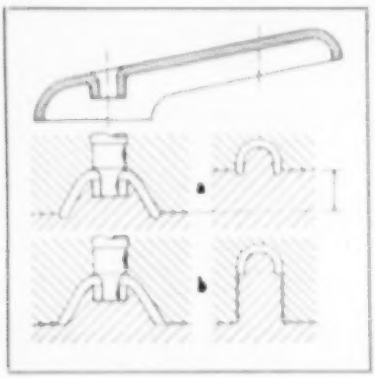


FIGURE 9. IRREGULAR PARTING LINES can often be avoided when the edge of a die casting is finished square in the manner shown, for the core forming the interior of the component can be brought to the outside edge and may enter the cavity at points where the profile of the component requires it.

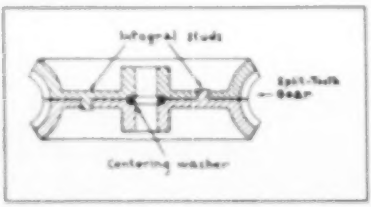
An example is shown, left, where the two die castings are identical in everything but form of cross section. That indicated at (a) has a rounded edge which necessitates constructing the die with a profile the same as that of the component, but the almost identical form on the right, differing only in the square corner, allows the whole underside of the casting to be formed by a core, the main face of the die remaining flat.

With this type of construction the flash is formed perpendicular to the parting line and cannot be die trimmed. Flexible belts are employed for clean-up in most cases, since the flash formed between core and cavity wall is very light and breaks away readily.

FIGURE 10. ALTHOUGH ONE OF THE SALIENT ADVANTAGES of the die casting process is that it frequently allows several parts to be combined into one die casting, assembly by means of integral rivets is so simple and speedy that the contrary course also has much in its favor. It may often be economical to use two die castings to replace a single casting that previously required much machining.

An example is this gear wheel which meshes with a steel worm. If formed in one piece, by any process, the whole gear surface must be generated by machining, but by splitting across the smallest diameter, as shown, the component can be assembled from two identical die castings. Because of the tooth form, these have to be given rotary motion as they are ejected from the cavity.

FIGURE 10



dimensioned sections even than die castings, but only small parts can be produced by this method and the necessary ductility of the alloys employed renders the products very liable to accidental deformation in service.

Extruded stock maintains a good standard of dimensional accuracy, and sections of very complex form are now regularly manufactured. These are well adapted to flat components with little or no variation in thickness, parts that can be sawn from the stock extrusion and finished by tumbling, but more complex forms can only be produced by extensive machining.

Injection molding is the process most nearly allied to die casting in a functional sense, and most small components that could be die cast could equally well be produced as injection moldings. The synthetic materials available to the molder are, however, characterized by me-

FIGURE 12

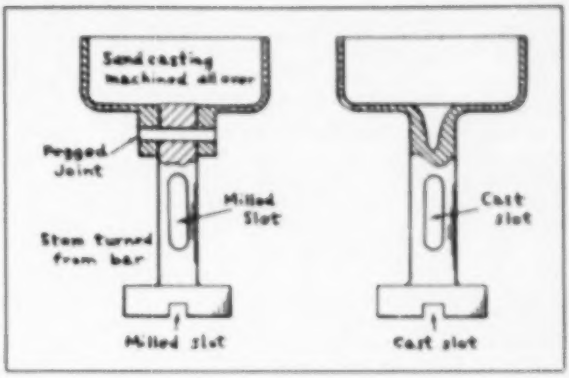


FIGURE 12. NEXT TO FOUNDRY PRODUCTS, parts machined from bar stock are most often converted to die castings. Although such parts can be produced at high production rates and at low cost, so that on a part-for-part basis conversion may not show any appreciable economy, it is often found that two or more screw-machine products can be replaced by a single die casting.

One reason why this is so may be seen above. The component shown on the left is produced in two pieces not for any functional reason, but because stock wastage would be astronomical if it were turned from bar stock. Even when formed in two parts there is a considerable wastage.

In the equivalent die casting on the right, one-piece production entails no wastage of material, and further allows the formation of two slots in the thin flange that previously had to be punched in a separate operation. The cross-slot in the head, and the keyway in the stem, are cast to form without the use of sliding cores.

Note that the heavy boss on one side of the flange is eliminated in the die casting; its presence was demanded by the need to peg the two parts together securely. Features like this often add greatly to the weight of an assembly and still leave the joints relatively weak, whereas a one-piece die casting of thinner section is uniformly strong and better able to resist excessive stresses in service.

FIGURE 11

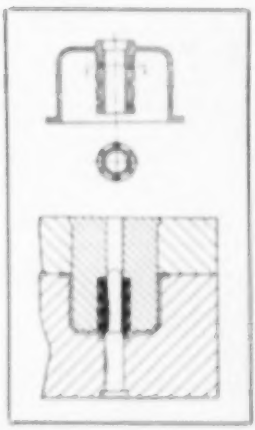


FIGURE 11. CORED RECESSES in sand castings can be of more complex form (though of less accurate location) than is possible in die castings, but the disparity is not so great as is sometimes thought. The form of core in die castings is limited by the fact that solid steel cores can be only drawn in straight lines, in circular arcs or along a helical path, and by the obvious limitation that the component must be provided with a hole large enough to withdraw the greatest section of the core through.

In a number of applications, however, unmachinable forms that could be sand cast only with a low degree of dimensional precision have been successfully die cast with great accuracy by making use of "self" inserts; that is, by placing one die casting in the die as an insert and casting another part on to it.

An example is shown above. The cuplike component pictured carries a grooved and ribbed internal spigot. The interrupted grooves cannot be machined if the part is produced with a solid smooth spigot, but by die casting the spigot separately and inserting it into a second-operation die the required form is attained without difficulty.

chanical properties which are very low when compared with those obtained in die castings. This fact, coupled with a low softening point, renders injection moldings unsuitable for all but the most lightly stressed services.

The most notable feature of moldings is the wide and attractive color range available, and some designers have evolved products of high structural strength and colorful finish by molding thermoplastic resins around a die cast armature. It should be noted, though, that basically similar results are obtainable by dip-coating die castings with "gel" lacquers.

(Continued on Page 31)

FIGURE 13

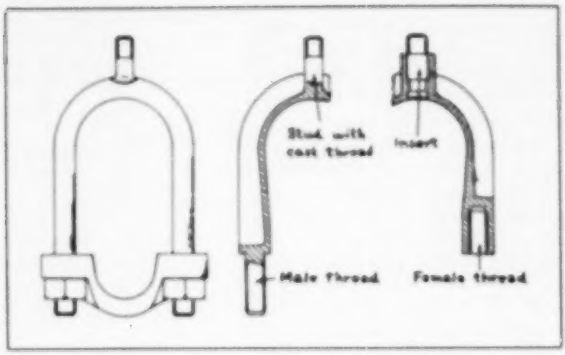


FIGURE 13. CONVERSIONS OF COMPONENTS bearing screw threads call for careful scrutiny before a final design is adopted, and it is occasionally advantageous to reverse the previous position of the male and female elements in an assembly.

An example of this is the clamp, pictured above, which was originally produced from a rod threaded at the ends and bent to form, the smaller diameter threaded spur being welded on. The ends of the rod pass through a yoke and are tightened by hexagonal nuts. In converting this component to a die casting it was recognized that the circular section should be replaced by a channel, but in the first design the ends of this part were shown with male threads that would have to be split along the parting line and which, moreover, would have caused a sudden increase in section thickness.

Consultation with a die casting company resulted in the adoption of the design shown on the right, the die casting now bearing tapped threads and being secured by hexagon head bolts passing through the yoke. The small spur thread was replaced by a threaded insert anchored in the casting. The yoke remains unchanged in design.

The simple change allowed the main casting to be produced from a collet die and simplified trimming, while the tapping of the cored holes was a much simpler operation than trimming or chasing the male threads would have been. It will be observed also that the section thickness remains even from end to end of the component.

FIGURE 14

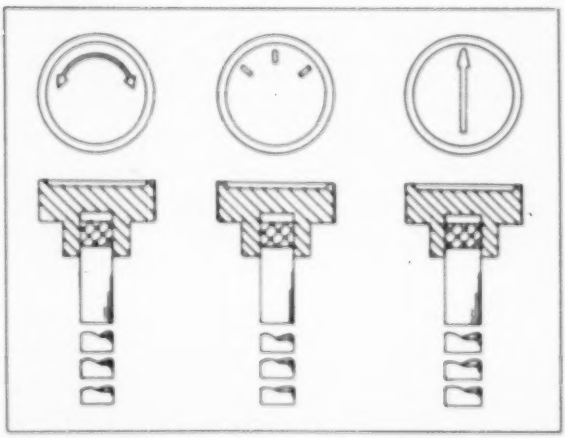


FIGURE 14. AN ASPECT of die casting which does not always receive adequate attention is the scope which it offers for the production from a single die of a number of parts differing slightly in design. This facility frequently goes far to offset the necessarily high initial tooling costs.

A simple example, above shows three control knobs with similar profiles, but in which the engraving on the top face differs. Each pattern is required in four different stem lengths, so that for inventory purposes there are twelve distinct components.

All these are produced from a single die by making use of interchangeable plugs to form the three patterns of engraved head, and by fitting an adjustable stop in the housing for the steel insert to provide the four different lengths of stem. The quantities in which these control knobs were required would not have sufficed to amortize the tooling charges had a separate die been required for each pattern, but by spreading the initial outlay over the whole series they became a practicable and satisfactory proposition for die casting.

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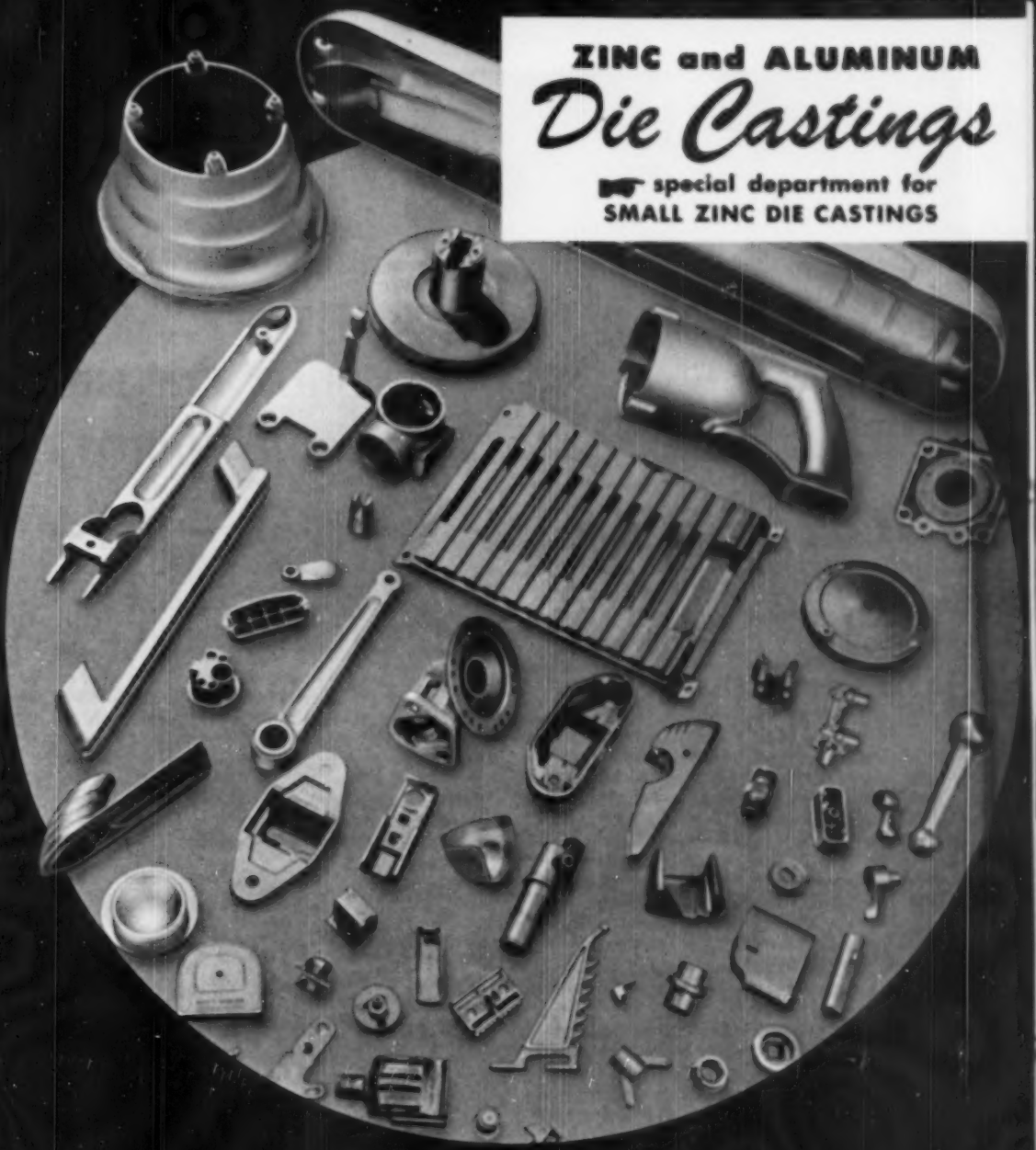

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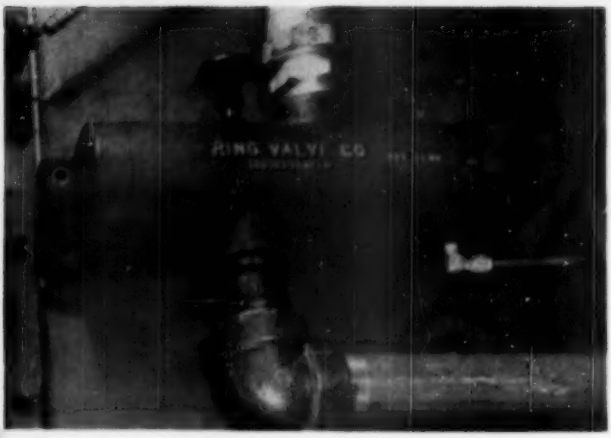


Figure 1. A simple unit consisting of two needle valves to control both halves of the shot cycle is installed in the hydraulic system of the die casting machine.

SHOT CONTROL IMPROVES

Metal Flows into Die

TURBULENCE in the flow of metal as it enters the die casting die is a source of difficulty in the production of parts requiring a surface suitable for plating, or an internal structure which is free of any significant amount of porosity.

Fundamental for minimizing or eliminating flow marks, cold shuts and other defects which are the bane of the electroplater, is careful design of the part and of the die, with special attention to any feature which might restrict or impede the smooth flow of molten metal.

Thus, the die caster has determined by experience the proper relationship between gate orifice and cavity size, as well as the tricks of gating and venting to evacuate air ahead of the inflowing metal.

Further, the product designer has contributed much by learning to eliminate sudden changes in section thickness, by allowing ample fillets and radii and by providing ribs in strategic positions to encourage the steady movement of metal without swirling or spraying.

However, many types of die castings are of such a shape or degree of complexity as to resist all efforts to obtain a substantially smooth and unblemished surface by ordinary means. Frequently, the intricacies which complicate the problem of obtaining a smooth surface are the very reasons for having selected the die casting process in preference to some other fabricating method.

In such cases, extra polishing and buffing have been used to work out surface defects which would interfere with smooth plating. This has been true of many automotive trim die castings having large area and intricate shape or exceptionally thin section.

Injection Cycle Is Critical

Other factors also play an important role in obtaining a hardware finish. These include metal temperature, die temperature, alloy com-

Figure 2A. At the beginning of the shot, metal is at normal level in the pot and gooseneck, with the plunger withdrawn. Problem is to move metal through the gooseneck into the die cavity with minimum turbulence.

UNIT
SURFACE QUALITY

in Two Stages

Better surface for plating obtained by use of new shot control unit which flows metal into die at slow speed and then applies full pressure at end of stroke. Device also reported useful for reducing porosity.

position, die finish and casting cycle. Each one must be controlled closely.

Of these, one of the most critical factors in improving surface quality is the injection cycle. Concerning this, it has been pointed out by A. W. Sundwick in a paper on the surface quality of zinc die castings,* "Turbulence could also be reduced by designing the shot mechanism in such a way as to provide for relatively slow movement of the metal through the extension nozzle, sprue and runners; and fast movement at the end of the shot when the cavity is being filled."

Although the desirability of a controlled injection cycle has long been apparent, it is only recently that a mechanism has been introduced for accomplishing this. An automatic shot control unit manufactured by the Ring Valve Company, Inc., of Clawson, Michigan, regulates the shot cycle and injects the metal in two stages.

This automatic shot control unit, shown in Figure 1, is installed in the hydraulic system of the die casting machine. By means of two needle valves, each of which can be preset for the desired cycle, hydraulic pressure on the shot piston is applied in two stages, as illustrated by the diagrams in Figure 2.

By adjustment of the needle valves, the duration of each portion of the cycle can be regulated, and the shot can be varied from one inch to full stroke. Thus, the operator can set the unit in accordance with a predetermined cycle and rate of speed which has been found to give optimum results. The cycle can be adjusted to suit each individual die simply by turning the two valves.

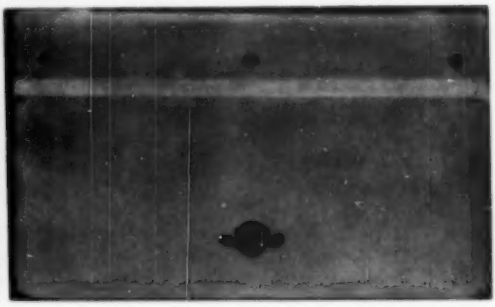
On a typical setup, the unit controls the downward stroke of the plunger at any desired rate

Figure 2B. For the first portion of the shot cycle, the plunger moves downward slowly to flow the metal into the gooseneck and through the gate. Only enough pressure is used to flow the molten alloy steadily.

Figure 2C. Final portion of the cycle is a rapid application of full hydraulic pressure to complete filling of the cavity. This prevents unnecessary swirling or spraying of the metal and helps to establish smooth surfaces and dense, compact internal structure.

Narrow Gate Opening, Thin Cross Section, Caused Difficulties

Cross section of the sprue and casting for an auto glove compartment door, above, shows why this part is difficult to produce with a good surface by using full pressure throughout the shot cycle. Extremely narrow gate orifice (A) is only .028 wide, thus restricting the flow of metal; two angles (B) set up turbulence as metal moves through cavity, and the uniformly thin cross section is hard to fill completely. Die casting, *below left*, reveals the type of surface obtained on this part when full pressure was used throughout the stroke; casting, *below right*, was produced with smooth surface by two-stage injection using a shot control unit. Both photographs are unretouched.



of speed until approximately two-thirds of the metal has been flowed into the cavity. The hydraulic line is then fully opened, exerting full pressure on the metal, and producing a dense casting with a smooth surface.

This automatic shot control unit is suitable for installation on either hot or cold chamber machines for the die casting of zinc or aluminum.

Thin, Flat Casting Has Three Complications

A particularly difficult die casting job on which this shot control unit is now being used with success is a door for an automobile glove compartment, Figure 3.

Surface finish requirements on this part are especially high, inasmuch as the piece is given a spray coat of flat enamel and then is wood grained, a treatment which emphasizes any slight flaw in the surface of the casting.

Three complications make this piece difficult to produce: (1) position of the gate along the curved edge of the casting limits the gate opening to .028, which acts as a restriction on the entry of metal; (2) the presence of two sharp angles joining three flat planes sets up turbulence which interferes with the smooth flow of metal; and (3) the uniformly thin cross section makes it difficult to shoot the metal to the far edge of the cavity before solidification begins.

The large number of rejects formerly experienced with this part were due to flow marks, folds and actual holes all the way through the casting. However, the introduction of the Ring shot control unit into the hydraulic system has been credited by the die caster with overcoming the defects.

The use of a regulated injection cycle also is reported to have a salutory effect upon die castings which are to be plated by eliminating or reducing buffing and polishing.

Porosity In Thick Sections

Potential use of the shot control unit where internal porosity is a problem has also been indicated. One large manufacturer of automotive

fuel pumps was faced with a high percentage of rejects due to the occurrence of porosity in a heavy internal wall of the die cast pump body.

Utilization of slow plunger speed during the filling of the gate and cavity, followed by a full pressure stroke to complete the injection, is reported virtually to have eliminated rejects due to this cause.

Where porosity is a source of concern for parts such as certain die cast hydraulic components, pressure regulators and fuel injection systems, use of the shot control unit may offer a practical production method. Although many such parts are now being die cast successfully, it is believed that the economy of the die casting process could be used for many more such parts if specific porosity problems were overcome.

Full Pressure, If Needed

Installation of the shot regulating unit does not interfere with jobs where the slow portion of the cycle is not needed. Thus, for a die having several small castings on which finish is no problem, the valve can be set for full pressure throughout the stroke to give the most rapid filling of the small cavities.

This shot control unit is designed to bring under control one important factor affecting the surface quality of die castings—the shot cycle. It is, however, intended to be used in conjunction with skillful die design, careful control of metal and die temperatures, proper part design and closely held alloy composition. Control of the injection rate gives to the die caster the ability to overcome certain die casting defects which appear to be incurable by the other means at his command.

[1] A. W. Sandwick, "An Analysis of Surface Quality of Zinc Base Die Castings," *Steel*, v 121, September 11, 1947, p 94.

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AMERICAN DIE HOLDS LARGEST

AWARD WINNER

C. R. Maxon

C. R. MAXON, recipient of the first annual award of the American Die Casting Institute, was graduated from Pratt Institute in 1923 and entered the employ of The New Jersey Zinc Company the same year. World War I had clearly indicated the great need for zinc die castings with high strength and dimensional stability—properties which were lacking in the zinc alloys then available. The Research Laboratories of The New Jersey Zinc Company were actively investigating the problem and by 1925 had developed an alloy having all of the advantages of the previous alloys with none of their weaknesses.

It must be remembered that in 1925 there were only about 30 companies making die castings and consumed a total of only 15,000 tons of zinc. In 1950, there are almost 800 die castings plants and they will use 250,-

(Continued on Page 38)

INCREASING production for military purposes and a general tightening of the non-ferrous metals market colored all sessions of the American Die Casting Institute which held its annual meeting September 20-21 at the Edgewater Beach Hotel in Chicago.

Attended by the largest membership in its history, the Institute discussed many technical and management problems common to the contract die casting industry, elected officers, heard committee reports and reviewed the first year of the Certified Zinc Alloy Plan.

Austin Lillegren, vice president of Madison-Kipp Corp., was elected president to succeed A. J. Sanford, president of Cleveland Hardware & Forging Co., who has served in that capacity for the past six years. Re-elected were Geoffrey Rollason, general manager of the Die Casting Division of Aluminum Company of America, as vice president, and David Laine of New York as secretary. All directors were re-elected.

Highlight of the technical session was a panel discussion of "The Production of Quality Zinc Die Castings" participated in by W. J. During, vice president of Precision Castings Co.; Austin Lillegren of Madison-Kipp Corp., and Charles Pack, vice president of Doehler-Jarvis Corp.

INSTITUTE AWARD GOES TO C. R. MAXON FOR PROVING DEPENDABILITY OF DIE CASTINGS

FOR demonstrating conclusively to government engineers and purchasing groups the dependability of zinc base die castings, the American Die Casting Institute has presented its first an-

1.

2.

Seated at the speaker's table at the annual banquet of the American Die Casting Institute were, left to right: (Figure 1) David Laine, secretary; J. A. Mullen, director; Frederick Schroeder, director; H. H. Wenn, director. (Figure 2) Charles Pack, director; Arthur Chase, director. (Figure 3) C. R. Maxon, award winner; A. J. Sanford, retiring president; A. T. Lillegren, new president; Geoffrey Rollason, vice president. (Figure 4) Henry Schroeder, director; A. W. Simpson, director; J. M. Davis, director; L. G. Vanderhoef, director.

CASTING INSTITUTE ANNUAL MEETING

nual award for "the outstanding achievement contributing to the die casting industry" to C. R. Maxon of The New Jersey Zinc Company.

This award was made at the banquet which climaxed the three-day annual meeting of the Institute in Chicago September 19-21, and is a popular recognition of Mr. Maxon's accomplishments while working with federal agencies in Washington and the Canal Zone earlier this year.

Representing jointly the American Die Casting Institute and the American Zinc Institute, he encountered an inconsistency in government purchasing and specifying practices which was based apparently on an unfamiliarity with industrial standards relating to the impact strength, tensile strength and other mechanical properties of on-grade zinc die castings. Such products as trucks, for example, which included large numbers of die cast components, were specified without question for Canal Zone service, while other equipment which used die castings was sometimes considered unsuitable.

Maxon was able to demonstrate to government engineers and purchasing groups in Washington what industry has known for nearly two decades —that on-grade zinc die castings, ordered under existing government specifications and made in compliance with long-established industry standards, could be relied on to stand up in gruelling service, even in the severely destructive atmospheres of Panama.

Then, on the recommendation of Washington officials, he traveled to Panama and resolved the doubts of Canal Zone engineers. This mission,

(Continued on Page 38)

NEW ADCI PRESIDENT

A. T. Lillegren

AUSTIN T. LILLEGREN, newly elected president of the American Die Casting Institute, has a long record of service to the die casting industry, both in his capacity as an officer of Madison-Kipp Corporation and as an active member of the Institute.

He has been a sales executive or officer of Madison-Kipp since joining the company in 1918.

As vice president of Madison-Kipp, he became active in Institute affairs and was chosen vice president and then president of the Chicago Regional Group. In 1947, he was made a director of the national organization.

In 1945 he was selected by the Die Casting Group for appointment by the Research and Development Service of the U. S. Ordinance Department, to investigate the German die casting industry. Starting in April, 1945, he visited the important die casting plants in Germany representing 75 percent of the

(Continued on Page 38)

3.

4.

AWARD WINNER, C. R. MAXON

(Continued from Page 16)

000 tons of zinc in making die castings valued at about $175,000,000.

Mr. Maxon was assigned the responsibility of having the new alloy tested commercially by the die casters and to determine whether its acceptance would result in an increased market for the company's grade of zinc. The die casters readily accepted the new alloy and standardized on its use.

Perhaps of even more importance was the problem of convincing industry that it should be using increasing quantities of the new strong and dependable zinc die castings. The automotive industry, then as now, was the largest consuming market for zinc die castings, but its use was restricted to the relatively insignificant radiator cap and a few door handles. As their experience with zinc die castings increased, they gained confidence in their use and found literally dozens of new applications for the new alloy.

The same situation was true in the electrical home appliance field, particularly with respect to washing machines, and also in the business machine industry. In fact, the increase in the use of zinc die castings has closely paralleled that of the entire durable consumer goods field.

In collaboration with various other members of his company, as well as many individuals from the die casting industry itself, Mr. Maxon has continued to further develop and exploit the many unexplored markets for zinc die castings. In that capacity, he is a member of the Market Development Division of The New Jersey Zinc Company in their New York office.

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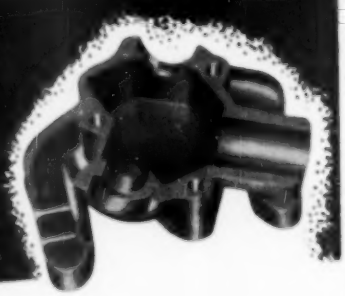
If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.



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DIE CASTING COMPANY

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NEW ADCI PRESIDENT

(Continued from Page 37)

die casting tonnage of that country, and made a complete report on his findings to the Ordnance Department.

Mr. Lillegren was chairman in 1949-50 of the Speakers' Committee of the Mid-West Regional Group and he has also served on the Publicity Committee for the Certified Zinc Alloy Plan of the Institute. He has also been a member of the Engineering Committee of the Institute for several years.

INSTITUTE AWARD

(Continued from Page 37)

with its subsequent influence on purchasing in all government supply departments, is viewed as having a profound importance to manufacturers in scores of industries. He showed, for example, the vast increase in use during recent years of on-grade zinc die castings as components in motor vehicles, aircraft,

builders' hardware, plumbing supplies, household appliances, communications and other electronic equipment, photographic and optical apparatus, laboratory equipment, office machines, clocks and many other products, including applications used directly in national defense.

The award, known as the Doehler Award, was presented by David Laine, secretary of the Institute. It includes a plaque, a certificate reciting Maxon's achievement, and a cash award of $500.

HEADS SALES FOR HUPPERT

The appointment of Benjamin Sampson as general sales manager has been announced by K. H. Huppert, president of

Benjamin Sampson

the K. H. Huppert Company, manufacturers of electric laboratory and industrial furnaces and ovens.

Mr. Sampson was formerly district sales manager of the Stewart Division of the Sunbeam Corporation, and recently manager of the Industrial Furnace and Oven Division of the Claud S. Gordon Company.

TWO AWARDED FELLOWSHIPS

Two graduate fellowships established by the Crane Company at Illinois Institute of Technology have been awarded to Wilbert G. Kautz of Chicago and Earl A. Phillips of Riverside, Illinois.

The awards, leading to a master of science degree in mechanics, were announced today by W. A. Lewis, dean of the Institute graduate school.

NAMED ASSISTANT

Earl R. Mellen, president of the Weston Electrical Instrument Corporation, Newark, N. J., has announced the appointment of James J. Hagan as assistant plant manager.

TEACHES METALLURGY

Charles H. Parcells, who received his master's degree in June at Illinois Institute of Technology, has been appointed an instructor in metallurgical engineering at the Institute.

Parcells, a native of Rochester, New York, received his bachelor of science degree in 1944 at Rensselaer Polytechnic Institute, Troy, New York. After graduate work at Carnegie Institute of Technology, he transferred to Illinois Tech.

PLEASANT MEMORIES
We Like to Look Back
25 and 30 Years
Most men like to reminisce; and we get a particular pleasure out of thinking back to our first years in the die casting business. For it was then that many of our present customers placed their first orders with us. The memory is made even more pleasant by the fact that these business relations have grown year by year and, in many cases, have developed into warm personal friendships.
We look upon this as proof of customer confidence in Badger service and quality. May we suggest that you, too, can benefit from our experience and modern facilities.
BADGER
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A COMPARISON OF COMMERCIAL DIE CASTING MACHINES

By W. J. DURING
Vice-President and General Manager
Precision Castings Company, Inc.

MODERN die casting technique has developed very rapidly over the past five years primarily due to the tremendous increase in the use and acceptance of die castings by every manufacturing industry. The requirements of these new techniques have very naturally carried over into the machines used for die casting and have promoted the many changes in design and construction which make present, modern equipment vastly different from the old two and three man machines of the past.

Many Sizes and Types of Die Casting Machines Available

The continuously increasing size of castings that are being made, the higher percentage of castings with hardware finish requirements, and the many new parts with extremely complex shapes and thin walls all have been instrumental in the development of more and more different models and sizes of machines to fit these diverse die casting needs.

According to one die casting machine manufacturer, there is available, for instance, a small but practical machine of high speed which will produce 600 gates of castings per hour weighing up to 2½ lbs. in zinc under 1,000 P. S. I. injection pressure, or 1¼ lbs. under 2,000 P. S. I. injection pressure. A push of one electric button places the machine through its complete cycle with each phase of the cycle automatically timed and controlled.

At the other end of the size range is a demand for a 1,000 ton locking pressure machine which shoots 30 to 40 lbs. of zinc or 20 or more pounds of aluminum. In between these two are of course the many other sizes, each of which is most useful for the range of castings within its own specified capacity.

For the many castings requiring insert placement into the die cavities, the vertical models of machines come into their own. Available in both hot chamber models for zinc, and cold chamber for aluminum, these machines have more than proved their worth by practically eliminating the die damage and down time which occurs when inserts placed by the operator into the die cavities fall out of place during closing of the die; an occurrence that continually takes place on horizontal type machines.

With the increased use of aluminum, cold chamber machines have become the standard rather than the exception for handling this metal. The dipping gooseneck machine of the past with its constant danger of a gooseneck exploding with injury to the operator, although still in use in some plants, is becoming more or less extinct. There are still some claims that it produces better aluminum castings, although the unsurpassed quality of aluminum castings made on cold chamber equipment tends to disprove

* This is the text of an address presented before the Midwest Group of the American Die Casting Institute, April 11, 1950.

this; but even if true, does not balance the danger factor ever present in dipping gooseneck machines.

Convertible machines which can be used for zinc with a gooseneck plunger injection unit, and can be converted to produce aluminum using a cold chamber mechanism, are also an aid in giving die casting producers more flexibility with fewer pieces of equipment.

Adjustability and Control of Metal Injection Speeds and Pressures

The many different factors which enter into the production of solid, dense, castings with an unblemished finish, a goal all are striving for, should be controllable in the machine as well as in the die. Pressure, speed, and temperature are, of course, the most important factors.

Injection pressures are now, in most machines, completely adjustable so that any variation desired can be obtained to suit the individual casting being made. In the production of aluminum where higher pressures than for zinc seem to be in order, 40,000 lbs. P. S. I. and more, have been used yet many zinc castings are made under 700 lbs. P. S. I. with reasonable customer acceptance.

Again, in the production of aluminum castings, a drop-off in pressure during the end of the injection plunger stroke, which occurred on most machines, had seemingly affected casting quality. Therefore, a new device was necessary for multiplying the pressure during the end of the plunger stroke so that increased, rather than decreased, pressure would pack more metal into the die, immediately adding to the density and thus quality of the castings. This injection pressure multiplier unit should be entirely automatic and self contained, and function uniformly.

Variable speed of injection, control of which is so important, is also a "must" in today's machines. On hydraulic equipment, the nitrogen accumulator is used by many to speed injection or is sometimes throttled for a slow plunger stroke. The same, or course, can be done on the air shot machines with valve control.

With the availability of these more exacting adjustments of pressure and speed, a proper balance between the two can be more easily obtained in order to control metal injection speeds and results.

The maintenance of proper metal temperature, again particularly in aluminum, has become an important die casting requirement. Gas is still the heating medium most prevalently used, but electric induction type furnaces are starting to come into their own for the melting of aluminum.

The new induction type furnaces, by keeping the metal temperature more uniform and by reducing oxidation and thus dross, have been instrumental in improving casting quality. Even though the high original cost of an induction furnace as compared to a gas furnace is a deterrent, reduc-

ZINC																											
REED PRENTICE CORP.	1	28x28	3	4	15x15	18x21	22	10	10	50	150 Tons	1			90	8.2	12 Oz.	1760	72	8,300	56	22	15	10,250			
	2	36x36	4	4	24x24	28x28	35	16	14		400 Tons	2			1600	72	22 Oz.	2140	82	15,000	512	5	13	13,500			
RUE MACHINE CO.	8h 18	20 x 20G	36	4	10G x 10G	12G x 31G	25	1	12	62	300 Tons	2			4.05	24		2730	7	16,500	1-1 1600 P.C.	22	12 1/2	12,465			
	8h 40	30 x 41	6	4	20x20	28x31	25	10	17.5	8	400 Tons	2			1305	13		7000	8	20,250	2-1 1600 P.C.	16	25 1/2 40	20,315			
CLEVELAND AUTOMATIC MACH. CO.	50	22x10	2	4	10x10	20x16	15	9	9	95	90 Tons	2			650	8 Oz. Equiv.	1.8 12 Oz.	2200 80 Cu. In.	5	8,250	3-1 1600 P.C.	1.34	10	8,500			
	400	36x36	4	4	28x28	32x28	25	8	8 to 12	45	400 Tons	2			1400	50	1.8 12 Oz.	1700	7	12,500	3-1 1600 P.C.	1.83	10	10,500			
LESTER PHOENIX INC.	4T 1	2 1/8 x 25	Dbl. Piston cast steel frame				15		8	12	225 Tons				900	8 Oz. 12 Cu. In.	8 12 Oz.	1300 80 Cu. In.	36	6,000	1-1 1600 P.C.	7	13	11,000			
	4T 16	2 1/2 x 24	Dbl. Piston cast steel frame				9.5		10.5	72	700 Tons	2			1200	12	2.5 12 Oz.	1800	8	14,000	2-1 1600 P.C.	24	25	22,700			
HYDRAULIC PRESS MFG. CO.	150	24S x 24S	3	4	15S x 15S	18S x 18S	20	10	12		150 Tons	2			250 at 200	11	12 Oz.		84		470	1.2	25	14,270			
G. & W. MFG. CO.																											
		36x36	4	4	24x24	28x28	30	8	8 to 12	45	250 Tons		22		1050	12	12 Oz.	1700	72	12,000	4		72				
MILLER TAYLOR MACH. CORP.	102	28x28	32	4	13x13	18S x 18S	24	8	8 to 12	4 3/8	175 Tons				800	7 Oz. 2 1/2 Cap.	16 12 Oz.	1800 80 Cu. In.	36	8,000	2-1 1600 P.C.	32	16	11,000			

tion of casting rejects often quickly makes up its original additional expense. As far as upkeep goes, this depends entirely upon the relative costs of gas and electricity in different localities, but on the whole favors gas. One additional drawback of the induction furnace is its necessity for 24 hour operation to prevent solidification of the metal, but counterbalancing this is its asset of throwing off far less heat, which represents less fatigue and greater production by the machine operator as well as greater comfort in warm weather and freedom (in some cases) from objectionable fumes.

Design Features Which Make Die Casting An Easier Job

Many, many are the built-in design features of present machines which save die set up time, and make die casting an easier, simpler job.

When a die tends to be too large and extend beyond the top of the die platen with an overbalanced position on the platen, it is possible on most machines to lower the die below center on the platen and thus more centrally locate it where the machine can give it the greatest locking strength. This condition occurs more often with dies for aluminum where the cavities are all normally above the injection sprue. Two injection positions are thus desirable on the machine, with a simple method for either raising the entire die plate toggle assembly or for dropping the nozzle gooseneck pot unit, or cold chamber mechanism, both of which methods are used.

Die opening strokes have been increased to accommodate thicker dies for deeper castings. This die opening or separation is also now adjustable so that less stroke than the maximum available can be used for shallow castings, with a natural increase in casting speed for such parts. This simple adjustment, made by moving an electric limit switch which controls the stopping of the die platen, to the position desired can vary the opening stroke to the exact amount required.

It is also now possible to stop the movable die plate at any position in the opening cycle to break a casting free from the stationary half before pulling cores, which eases core pulling strains, and then let the die continue back for ejection—or in the closing cycle where the die has to be partially closed before inserts can be placed into the cavities due to interfering ejector pins or cores. Both of these timing movements can be push button electrically controlled with limit switch safeties to insure correct sequence operation.

Automatic ejection of castings is normally provided by an ejector pin bumper plate located in a stationary position behind the movable die platen. However, when extremely high ejection pressures are required for a deep draw casting or one without sufficient draft, an additional powerful ejec-

(Continued on Page 80)

ALUMINUM	Machine Type	Size Die Plates	Size Tie Bars	Number of Bars	Space Between Bars	Tie Bar Centers	Max. Die Space	Min. Die Space	Die Opens	Die Cylinder Dia.	Locking Pressure	Injection Pos.	Toggle Pin Sizes	Metal Pot Cap #	Metal Sleeve Cap #2	Metal Sleeve Bore	Metal Pressure #	Plunger Stroke	Hyd. Press PSI #	Pump Capacity	Cals per Cycle	Horse Power	Price	
Reed Prentice Corp.	15 x	28x28	3	4	15x18	14x21	33	10	16	5½	150 Tons	2			2.4	1½ to 2½	9,000	11	28,300	7.1 at 1000 PSI	4½		15	6,462
	3 x	36x36	5	4	24x24	29x28	30	18	14		400 Tons	2			3.0	1½ to 3½	12,000	14	38,400	7.5 at 1000 PSI	6		15	15,390
Lux Machine Co.	[illegible]	25 x 25½	3	4	17½ x 17½	21½ x 21½	20	7	12	4½	400 Tons	2		800	3.3	1 1/8 to 2 1/4	6,500	14	19,600	7.1 at 1000 PSI	4½		10 to 15	11,461
	[illegible]	38x41	6	4	40x25	46x31	38	10	17½		800 Tons	2		1000	3.6	1½ to [illegible]	16,000	15	50,250	27.7 at 1000 PSI	13		25 to 60	51,315
Cleveland Automatic Mach. Co.	90	21x18	2	4	16x14	20x18	15	4	8	4½	90 Tons	2	to * customer requirements		2.0	1.0 to 1½	3,060	8	9,400	9.8 at 1000 PSI	1.13		10	7,475*
	400	36x38	4	4	28x24	32x28	36	8		4½	400 Tons	2		900	3.3	1½ to 3.0	6,380	13½	19,965	8.8 at 1000 PSI	4.73		10	16,884
Lester Phoenix Inc.	[illegible]	21x22	One piece cast steel frame				18.18	5 5/8	8	3½	150 Tons	2		200	2.25	1.5 to 2.812	5,600	12½	11,700	4.8 at 1000 PSI	36		20	12,800
	[illegible]	39½ x 54	One piece cast steel frame				31½	2	16½	3 3/8	750 Tons	2		250	3.8	1½ to 4 1/8	6,250	17	38,850	7.5 at 1000 PSI	25		25	34,357
Hydraulic Press Mfg. Co.	150A	24½ x 24½	3	4	15½ x 15½	18½ x 18½	28	14	13	13 maximum 3 1/8	150 Tons	2			2.4	1.5 to 2.75	5,500	11	13,250	21.5 at 1000 PSI	1.8		20	12,675
	400A	36x38	5½	4	23x23	30½ x 28½	41	26	18	22 maximum 4½	400 Tons	2			4.3	1.0 to 3.5	8,500	10 to 18	28,000	08 at 1000 PSI	6		30	23,475
G. & M. Mfg. Co.																								
		36x38	4	4	24x24	28x28	36	8	6 to 12	4½	300 Tons			800	2.7	1.5 to 3.0	8,000	11½	28,000	8			7½	
Miller Taylor Mach. Corp.	10A	26x28	3½	4	15x15	18½ x 20½	24	6	6 to 10	4 5/8	175 Tons				3.1	1.6 to 4.0	4,000	12	15,390	9.8 at 1000 PSI	5½		10	16,561
	40A	40x40	4½	4	28x28	34½ x 34½	40	12	12 to 18½	5 5/8	750 Tons				5.5	1.2 to 4.5	8,000	17½	24,830	9.8 at 1000 PSI	5½		15	27,000

UP AND DOWN THE AISLES

at the National Metal Show

ACME MANUFACTURING CO.
Booth 218

AJAX ENGINEERING CO.
Booth 1501

BEDE PRODUCTS, INC.
Booth 2402

YOU WILL SEE: Complete line of paint heaters, including standard models, circulating heater and dip tank heaters; complete information on hot sprayed finishes will be available.

YOU WILL MEET: James A. Bede, president; Richard Estabrook, vice president; Harold Fornwall, Chicago representative.

G. S. BLAKESLEE & CO.
Booth 2203

CHICAGO RIVET & MACHINE COMPANY
Booth 2628

YOU WILL SEE: A display of rivets, along with automatic rivet setting machines for tubular and split rivets, both single setting, multiple setting with adjustable centers.

YOU WILL MEET: William Shineflug and Joseph A. Rehm.

COMBUSTION CONTROL CORPORATION
Booth 1231

YOU WILL SEE: Industrial and commercial flame failure controls and safeguards for manually and automatically ignited gas, oil and combination gas-oil burners.

YOU WILL MEET: L. D. Sibley, general sales manager; S. J. Pachyn, assistant sales manager; H. Christensen, Mid-West sales manager.

COMMANDER MANUFACTURING COMPANY
Booth 402

YOU WILL SEE: Commander production tools, including a universally adjustable multiple spindle drill head, a tapping machine that handles a wide range of tapping heads and a drill chip breaker that speeds up drilling operations.

DELTA MANUFACTURING DIVISION
(Div. Rockwell Mfg. Co.)
Booth 2701

DESPATCH OVEN COMPANY
Booth 2747

DETREX CORPORATION
Booth 2222

YOU WILL SEE: Special design of degreaser with rotary internal conveyor for handling work through a vapor-spray-vapor or a vapor-immersion-vapor cleaning cycle; rotary drum washer; rust-proofing compounds and alkaline and emulsion cleaners.

YOU WILL MEET: E. H. Ehlert; L. Camel; W. F. Newbery; G. W. Walter; N. A. Wismer; P. M. Schultz; N. A. Monaco.

THE DIVERSEY CORPORATION
Booth 619

YOU WILL SEE: Diversey No. 909, a heavy duty soak tank cleaner; No. 12, a reverse current electro cleaner; and No. 101, a reverse current electro cleaner and surface conditioner.

YOU WILL MEET: R. L. Shannon, manager Metal Industries Dept.; L. C. Hesoun; D. F. Seymour; A. J. Wurster; E. F. Manning; W. H. Murphy; W. R. Swift; A. A. Westfall; C. G. Smith and L. J. Moynes.

THE DoALL COMPANY
Booth 606

YOU WILL SEE: Line grinding method for machining hardened steel to repair broken dies or other hardened materials; hydraulic production cut-off machine; precision surface grinders and production band machine.

YOU WILL MEET: L. A. Wilkie, chairman of the board; R. J. Wilkie, president; J. W. Wilkie, treasurer; L. R. Rothenberger, general sales manager; C. H. Rosene; H. Pottle; J. Spooner; K. C. Glader; J. T. McRae; A. G. Mather; J. M. Glavin; R. J. Otey; R. L. Somers; J. G. Typoerl; F. J. Whelan; G. H. Sheppard; J. Harrington, and L. Cruise.

duPONT deNEMOURS & CO.
Booth 1602

DU-WEL METAL PRODUCTS, INCORPORATED
Booth 1715

ECLIPSE FUEL MFG. CO.
Booth 927

YOU WILL SEE: Air-gas mixer to provide automatic mixing for air blast-type combustion equipment; complete line of gas burners; pressed steel pots which are seamless and of the flanged round bottom type; the McKee-Eclipse Locktite Safety Valve adaptable to systems where gas pressure, air pressure or electric power is the controlling medium.

YOU WILL MEET: A. D. Wilcox, vice-president; E. S. Magnuson, vice-president; A. C. Perks, executive vice-president; J. S. Sands, executive vice-president; C. R. Wirth; R. W. Pixler; J. L. Schmauss; R. E. Hayden; J. K. Baker; H. E. Balsley; R. A. Walling; H. McPherson; M. D. Brandewine; H. H. Harrison; W. H. Kay; G. T. Desjardins.

ELASTIC STOP NUT CORP. OF AMERICA
Booth 123

YOU WILL SEE: ESNA elastic stop nuts and Rollpin self-locking fasteners for industrial fastening problems subject to vibration and shock. Rollpin is a new ESNA product reported to replace taper, grooved and straight pins.

YOU WILL MEET: E. F. Nason; D. E. Lally; Bruce F. Linck; Howard Peters; T. E. Burke; H. B. Schultz; D. B. Sorenson; R. S. Thompson; R. F. Fettig and C. W. Dean.

(Continued on Page 81)

SIZE AND SHAPE of these cover castings suggest the use of deep drawn steel, but die cast tooling is less expensive.

DIE AMORTIZED IN 8 MONTHS. Savings of more than 25 percent on machining due to square cored hole and other integral design features resulted in rapid write off of die costs.

1,000 UNITS PER YEAR

TOOL write-off is a bugbear that has frightened many a designer away from the die casting process, even though a brief investigation might have revealed sufficient saving in secondary operations to compensate for what seems to be high initial tooling cost.

The fact is, the die casting process does not depend upon production ranging into the millions of pieces in order to compete with other fabricating methods on a cost basis. It is frequently practical to amortize die costs over a few thousand units due to reductions in machining, assembling or finishing.

An outstanding example of the way in which die castings can provide the low-cost answer to production problems is the design of the Visualiner automobile wheel aligning equipment by the John Bean Division, a division of Food Machinery and Chemical Corp.

HOW IT OPERATES: By harnessing eight beams of light in an intricate optical system, John Bean engineers have been able to build equipment which gives micro-accurate readings of wheel alignment and increases the speed with which misalignment can be corrected.

The Visualiner projects two charts, one for each side of the

ZINC IS ATTRACTIVE WITH PLATED OR NON-PLATED FINISH. Complete Visualiner unit, *left*, shows smart contrast between rough polished, untreated zinc die castings which set off and accentuate the chrome plated strip across the top. On the other hand, the brilliant chrome plating on the front plate shown at right is also highly attractive.

LIGHT FOR EASY HANDLING. Where weight is to be kept at a minimum, as in these mirror assembly parts, aluminum die castings give lightness without sacrificing strength.

car, onto a large screen, and then, by means of additional beams of light reflecting from mirrors suspended from front and rear wheels, gives the operator an exact diagram of wheel alignment.

Relative positions of the projected beams on the charts indicate faults in caster, camber, toe and steering geometry. The operator sees the correction as he is making it, thus eliminating the old-fashioned trial-and-error method.

Since readings on the chart are enlarged from seven to 14 times in projection, very close accuracy is maintained.

Annual Quantities Not Great

Obviously, this equipment is a major installation for a garage and the number of units which can be sold per year is not great. Annual production lies in the neighborhood of 1,000 units.

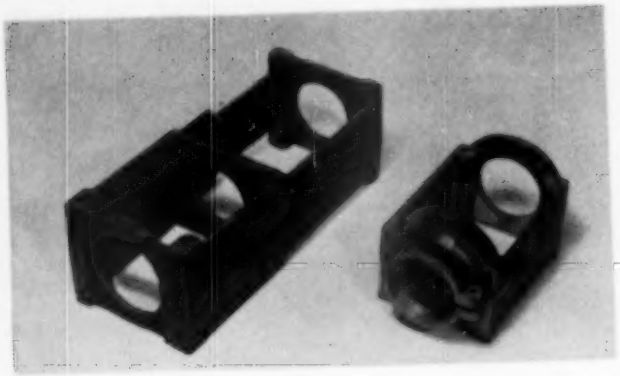
Basing their calculations on this production estimate, company engineers compared tooling costs, piece prices and production operations for alternative fabricating methods.

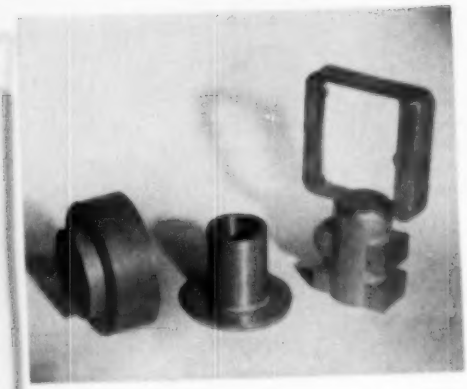
They found that the four side

DESIGN CHECK LIST

If you are using a large stamped or drawn housing and cast or stamped mounting elements, compare your results with those obtained by the Juke Boss Division.

Visualiner	Your Product
SIZE AND SHAPE. Large housings 24" x 14" x 4" with 1.16" section. Deep shell with bulged panel. Varying internal detail includes bosses, holes and flanges.	DIMENSIONS WEIGHT CONTOUR
ANNUAL QUANTITY of Visualiner units is about 1000. Four die cast covers per unit come from one cavity.	UNITS PER YEAR PIECES PER UNIT TOTAL NO. PARTS
TOOL COST for die cast dies are less due to clever die construction. For stamped housings, progressive blank, form and pierce dies, plus tools for forming and attaching internal brackets, would be needed.	FORMING TOOLS $ PRODUCTION TOOLS JIGS & FIXTURES
PIECE COST of the die cast housings is higher than for the stamped unit, but secondary costs plus tool costs make stampings more expensive.	PIECE COST * *Raw, Semi-finished or Finished
PHYSICAL REQUIREMENTS. Housings must protect delicate optical system from impact; internal mounting parts must maintain accuracy over prolonged service. Resistance to heat without warping or changing dimensions is important.	PHYSICAL REQUIREMENTS
FINISH REQUIREMENTS. Although not sold on basis of looks, durable surface is important. Inexpensive durable finish calls for polishing some zinc die castings, plating others. No treatment needed to prevent rust or corrosion.	FINISH REQUIREMENTS
SECONDARY OPERATIONS. Complete and ready to assemble, these die castings need only drilling of small holes, and tapping of screw holes.	No. of Operations DRILL & TAP MILL & GRIND REAM & BORE PUNCH & FORM ASSEMBLE OTHER TOTAL





STRUCTURAL ELEMENTS. For the two main mounting frames used inside the Visualiner to mount all optical elements, these two aluminum die cast parts are dependable and accurate.

ACCESSORIES. The instruments used by the garageman to check the accuracy of his equipment include these three zinc die castings.

covers, which measure approximately 24" x 14" x 4" and have a shape typical of deep drawn sheet, are less expensive if produced by die casting.

They found that dies for blanking, forming and piercing the four side covers would cost about four times as much as a single cavity die casting die from which all four pieces could be produced. Although each of the four sides has different detail such as holes and mounting bosses, the main shape is identical. Therefore, by the use of four interchangeable plugs in the die, the same cavity is used to cast all pieces, thus representing a considerable saving in tool costs.

Initial tool cost is not the only factor favoring die casting over deep drawing for these parts. If stamped, the housing would need the separate forming and assembling of all internal brackets. This would require forming tools for each bracket, plus welding jigs for assembling. As die cast, the mounting bosses

ONE DIE = FOUR DIFFERENT PARTS BY USING INSERTS IN THE CAVITY

One reason die cast tooling is less expensive for these large, thin-sectioned parts is the ingenious use of a single cavity with four different plugs to form varying interior detail in four housing parts having the same exterior contours.

are integral with the housing and call for only drilling and tapping of screw holes.

Finish is another place in which the die cast zinc shows its superiority over the sheet steel housing. The zinc sides are rough polished. No chemical treatment or coating is used. After several months of handling, the zinc darkens down uniformly and sets off the chrome plated top strip, making a very handsome unit.

If fabricated from steel, some treatment to prevent rust would be in order, and an organic or plated coating might be specified.

Exposure to Heat

The amount of heat generated by the three 150 watt lamps in the optical system had to be taken into consideration in designing the housing. Adequate ventilation has been provided by means of louvres around the top and bottom of each side piece. A squirrel cage fan beneath the optical system draws air upward, helping the natural movement of heat out through the louvres.

The case in which the optical system is housed sometimes reaches a temperature of 180°F. This exposure to heat has had no deleterious effect upon the zinc alloy die castings which form the housing, nor upon the aluminum die castings used for internal structural components.

Sturdiness Is Essential

The function of this housing is to shield a complex optical system from the hazards of constant garage operation. The rigidity of the die cast zinc housing is at least equal to sheet steel of a gauge suitable for this shape.

Weight of each side casting is approximately nine pounds, distributed over a relatively uniform cross section of about 1 16-3/32". The streamlined shape of the casting, with a bulged panel effect, adds to the stiffness of the entire unit.

The number of secondary operations performed on the housing castings are few. One large hole is drilled and several smaller ones are drilled and tapped. Extra bosses are milled off. The exterior surface is rough polished and the inside is given a spray coating of a flat, optical black synthetic enamel.

Chrome Plated Front Frame

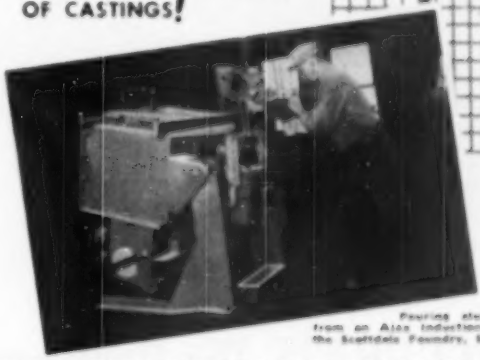
In striking contrast to the satiny finish obtained by rough polishing the large side castings is the brilliant chrome plate applied to the die cast zinc front frame for holding the front glass.

This casting, which might readily have been produced by stamping from sheet steel, is less expensive, more rugged and better looking as a chrome plated zinc die casting. The amount of clean detail obtained includes the company trademark, and a recessed panel effect.

This frame, if stamped, would involve a waste of about 50 per cent of the metal due to a large opening for the glass plate. There is no loss of scrap by die casting, and for additional economy, there is almost no machining. All mounting holes are

AJAX INDUCTION FURNACES

ARE KEPT BUSY PROVIDING ALUMINUM FOR MILLIONS OF CASTINGS!



Pouring aluminum alloy from an Ajax Induction Furnace at the Scottdale Foundry, Scottdale, Pa.

SUBSTANTIAL SAVINGS IN TIME, LABOR, METAL, AND FLOOR SPACE, PLUS HIGH COUNT OF PERFECT CASTINGS WITH AJAX ELECTRIC INDUCTION FURNACES

- No flux needed—no mechanical stirring—no segregation occurs, because metal is in constant circulation.
- Costs less than conventional combustion firing—avoids overheating as temperature control is completely automatic.
- Low upkeep—linings average two years of service—almost no down time—fewer melting losses.
- Temperature held within ± 5°F.—metal kept at lowest feasible casting temperature—no danger of overheating.
- Harmful impurities removed—less dross—no iron pick-up—iron impurities adhere magnetically to passage walls.
- High yield of perfect castings—a remarkably low scrap loss, said to possible only with Induction Furnaces.
- No fumes—almost noiseless operation—cooler shops—lower installation and maintenance costs.
- Automatic electric controls require a minimum of attention—less labor than for fired furnaces.
- Requires 30% to 40% less floor space than any other type of induction furnace—heavy steel construction for long life.

AJAX ENGINEERING CORPORATION, TRENTON 7, N. J.

AJAX TAMA-WYATT

INDUCTION MELTING FURNACE

cored with deep countersinks, and the only machining is the tapping of a small hole at top and bottom.

The frame is polished and gets the conventional copper-nickel-chrome plating cycle.

Aluminum for Lightness

Where lightness is a factor, as in the mirror assembly which is attached to the front wheel on the car, aluminum die castings have been used instead of zinc.

Four aluminum die castings are used, largest and most complex of which is the mirror bracket containing three surfaces at obtuse angles from each other for mounting mirrors. This casting has thin sections and deep ribs for lightness, rigidity and stability.

The other three aluminum die castings in this unit are the mounting and adjusting members which hold two vertical rods for the mirror support and also the clamps for attaching the unit to the car wheel. Chosen primarily for their economy, these additional castings feature the coring of numerous holes which require only reaming, boring or tapping.

Aluminum has also been selected as the alloy for two important frames used inside the Visualiner for mounting the optical systems. Every surface is used for mounting various elements of the optical system. Although the adjustment of the optical units does not depend upon the as-cast accuracy of the die castings, still it does depend upon the dimensional stability of the alloy during service. While all parts are independently adjusted for accuracy, it is essential that the mounting frames neither warp nor grow over a period of years, even when exposed to concentrated heat from the electric lamps.

Economy for Accessories

Economy has been the primary reason for the use of several zinc die castings in the two devices used for checking the accuracy of the Visualiner.

Two pairs of special assemblies for mounting mirrors at the outer end of long tubes, make use of die cast mirror housings. The device for checking the front mirrors includes two cylindrical mating pieces which might have been turned from sand cast iron, but at far greater labor and with greater loss of chips. Also, the iron would have required some coating or surface treatment to prevent rust on this critical unit, whereas the zinc die castings can be used without surface treatment of any kind.

The John Bean Division has been manufacturing the Visualiner since 1947, using a large number of die cast zinc and aluminum components.

The limited annual quantities have not precluded rapid write-off of tool costs; it has, in fact, been possible to pay for dies over less than one year's production in many instances where savings in operations and materials have been large.

Here are more

ACCURATE Die Castings

ROLL FILM ADAPTER FOR SPEED GRAPHIC CAMERA

THIS device permits roll film to be used with a speed graphic camera instead of the customary cut film. The castings, in addition to being very thin, have to be perfectly light tight around the edges. Each component part must fit perfectly. Practically no machining was necessary on this high precision job.

This was no unusual assignment for us. Rather it was typical of the type of work which is continually being turned out in our plant. We welcome inquiries on our facilities.

ACCURATE *Die Casting Company*

1089 EAST 80TH ST. CLEVELAND 4, OHIO

FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

DIE FINISHING

CRO-HONE

A compact wet-blaster designed for easy maintenance and low cost.

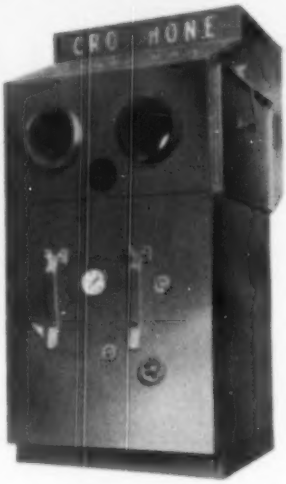
- End your costly hand finishing problems by Cro-Hone-ing your dies to remove scale or carbon and metal spray.
- Wet blasting will improve lubrication retention, offer a perfect base for plating and quickly and inexpensively remove all foreign matter from die surfaces.
- Parting lines and edges remain sharp.
- All directional marks are obliterated.

Cro-Hone wet blasting will also quickly remove flash from castings.

The Cro-Hone inexpensively produces a uniform, high lustre matte finish on die cast parts without changing tolerances.

Surface finishes of any group of castings will be 100% uniform.

For the plater of die castings, wet blasting offers the most economical pre-cleaning and results in the tightest bond.



Features of the CRO-HONE

SMALL AND COMPACT • LOWEST INITIAL COST • STAINLESS STEEL CONSTRUCTION • NO MAINTENANCE REQUIREMENTS • NO WEARING MOVING PUMP PARTS • LOWEST ABRASIVE REPLACEMENT COST • EASILY ADAPTED FOR AUTOMATIC OPERATION •

"Chrome Craftsman"

For information . . . call or Write . . . THE **CRO-PLATE** CO.
HARTFORD,
CONN.

DIE CLEANING

PRODUCTION CLINIC
for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man

PRACTICAL METHODS FOR FINISHING MAGNESIUM DIE CASTINGS

PART TWO

Blackening Treatment for Dowmetal R Type Die Castings

A process known as Chemical Treatment No. 4 has been developed[1] to provide a decorative black finish on die castings of the Dowmetal R type. The finish is reported to have some protective value and is suitable for mild indoor exposure but is not recommended alone for prolonged outdoor exposure or severe service. The finish serves also as a base for paint and improves the adhesion and durability of the paint coating. The treatment is applied by immersing the parts, suitably cleaned to remove oil and grease and any oxide coatings or previous chemical treatment, in a boiling solution of the following composition:

Potassium chrome alum ($K_2Cr_2(SO_4)4.\ 24\ H_2O$) ..... 4 oz./gal.
Sodium dichromate ($Na_2Cr_2O_7.\ 2H_2O$) ..... 13.3 oz./gal.

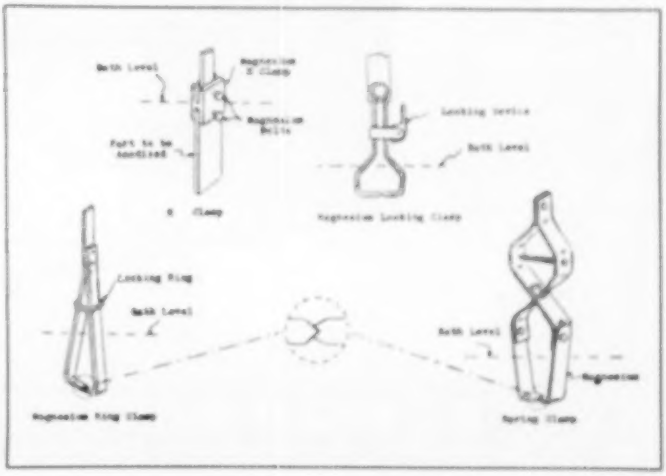
The time of treatment to secure a black color may range from 2 to 15 minutes, according to the freshness of the solution. Upon removal from the bath, the parts should be rinsed thoroughly in fresh water followed by a hot water rinse to facilitate drying. Properly applied, the coating is black and consists of a smooth compact layer adhering firmly to the surface. It has been found that more uniform coatings will be obtained if the as-cast surface film is removed by wire brushing, machining, buffing, or sanding. Treatment of parts in a depleted solution results in a superficial layer of brown powder which may be removed by wiping. The treatment solution may be restored to performance by additions of small quantities of sulfuric acid, generally not exceeding ½ fl. oz./gal. conc. H_2SO_4, or sufficient amount to just redissolve, on boiling, a brown precipitate which settles out during the treatment period. The need for reviving the solution is indicated by pale colors on the metal and the presence of quantities of a brown sediment in the solution and on the work. The bath may be revived in this manner about five times, after which it should be discarded.

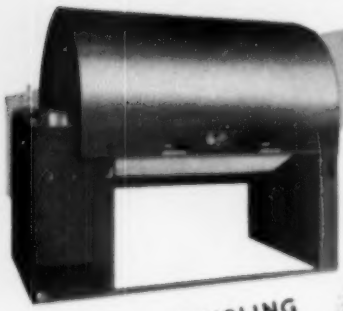
ANODIC CHEMICAL TREATMENT

The Dow No. 14 a-c anodic finish has been stated[1] to be the most abrasion resistant of the chemical treatments available for magnesium and to have the ability to cover surface defects in die castings.

The hard gray coating is deposited on magnesium by electrolytic treatment in an alkaline bath with the use of high voltage alternating current. The coating forms only during the

Figure 4. Types of clips used for holding magnesium parts during Dow No. 14 anodic treatment.





It's New! Completely Modern!

THE MURCO 32"x48" - 5 HP TUMBLING BARREL

HERE'S THE TUMBLING BARREL YOU NEED FOR A COMPLETELY MODERN PLANT LAYOUT.

incorporating all of the features demanded by up-to-the-minute Tumbling Barrel operators.

The new MURCO Tumbling Barrel is compact, and occupies less floor space. The motor and operating mechanism are totally enclosed . . . the only exposed parts are the hand-wheel controls, and the magnetic reversing starter. With variable speeds from 10 RPM slow speed to 25 RPM high speed you have an infinite range of speeds in between, to meet various operating requirements . . . speed changes may be made while the barrel is in motion, no cumbersome changes of belts or pulleys. The hydraulic brake stops the barrel in any position . . . and is easily accessible at floor level.

Facilitates loading and unloading, and prevents accidental dumping of loads. Completely safe in operation. A limit switch permits operation only when hood is closed.

Check the features of design and construction that contribute to the MURCO high efficiency. You'll see why MURCO Tumbling Barrels are preferred by those plants that deburr, burnish, clean, polish and smooth-surface metal and plastic parts on a mass-production basis. We will gladly send you complete information upon request.

DRIVE—The most foolproof, maintenance-free drive available. Speed reducer and cut gears carefully designed to do the job.

SPEED RANGE—Slow speed 10 RPM to high speed 25 RPM with infinite speed range in between.

SPEED CHANGES—May be made while barrel is in motion by smooth operating hand wheel within easy reach of operator.

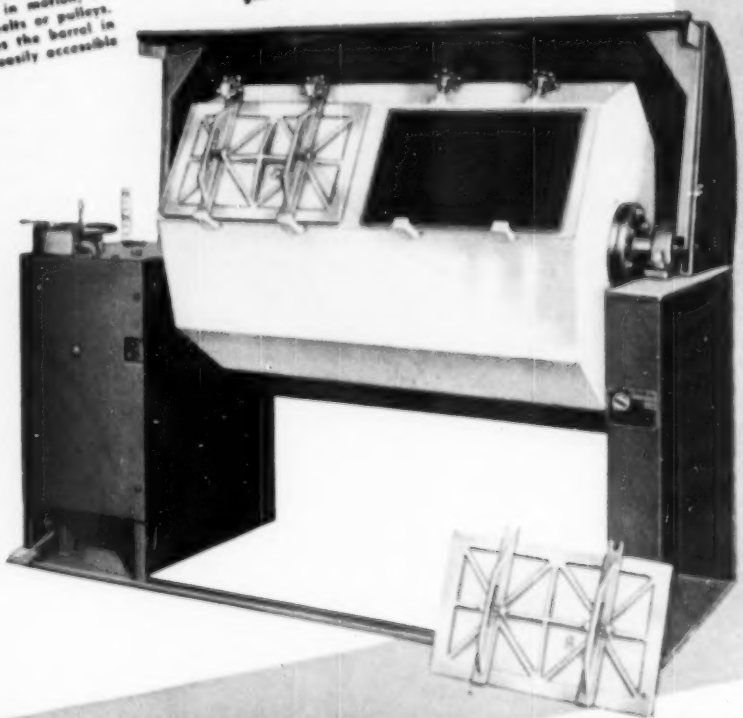
SIZE—Octagon barrel section 31½" inside x 33 11/16" each compartment with door openings 19" x 32"—doors are quick acting, easily handled.

CAPACITY—11 cubic feet per compartment (each barrel has two compartments).

HORSEPOWER—5 HP maximum to 5 HP maximum. 5 HP—1800 RPM, 60 cycle, 220-440 volt. Totally enclosed, fan-cooled motor.

CONTROL—Magnetic reversing starter, reversing master switch, limit switch safety control and guard cover (timer control optional).

BRAKE—Foot pedal operated and mounted on the left side of tumbling barrel near the floor.



D. J. MURRAY MANUFACTURING CO.
WAUSAU *Manufacturers Since 1883* WISCONSIN

SAMPLE PARTS PROCESSED
At no charge or obligation we will process sample parts for you . . . write today for complete details.

current cycle when the magnesium part functions as the anode.

Magnesium parts to be given the No. 14 anodize treatment must have surfaces free from oil and grease, previously applied chemical finishes, or oxide coatings. In cases where oxide or chemical coatings are not completely removed by alkaline cleaning in a heavy duty cleaner of the type described in the preceding section, a pickling bath of the following composition should be used:

Chromic acid	24 oz./gal.
Sodium Nitrate	4 oz./gal.
Magnesium fluoride	⅛ oz./gal.

Parts are immersed in the above solution, operated at 71-81F., until all visible oxide or old chemical finish is removed. Die castings require only a short dip (15-30 sec.) to remove oxide coatings. After immersion, the parts are rinsed immediately in cold running water, then in hot water.

The solution recommended by the Dow Chemical Company for the No. 14 anodic finish has the following composition:

Phenol	1 oz./gal.
Sodium hydroxide	1/3 oz./gal.
Sodium metaborate	.2 lb./gal.
Sodium metasilicate	9 oz./gal.

In following the procedure recommended for preparing the solution, the treating tank is filled with approximately half the quantity of water desired. Next the phenol, which is solid at room temperature, is melted in a quantity of hot water (Temp. above 106F.) and added to the tank. The sodium hydroxide is added immediately with vigorous agitation. Sodium metaborate, sodium metasilicate, and the balance of the water are then added.

Magnesium parts are suspended on both electrodes of a source of 120v alternating current making certain that the surface areas of the work on each electrode are approximately equal. Parts which contain recesses must be racked so that no air or gas pockets occur during treatment.

One point should be kept in mind, namely, a load should consist of one alloy only; that is, aluminum-containing and aluminum-free alloys should not be processed together because of the difference in maximum voltage required.

For best results, recommendations are that the anodizing bath be operated at 70-81F. and agitated, either by air or by use of a water cooling coil plus mechanical agitation. Racks and clamps for holding magnesium parts for anodizing should be constructed of magnesium in areas below the bath level. Dowmetals C and O-1 are satisfactory. Points should be kept sharp to maintain good electrical contact.

Types of clamps recommended for this treatment are shown in Figure 4. It is unnecessary to strip the coating from racks and clamps after each treatment cycle. A steel (or magnesium) tank may be used for the anodizing solution.

The relatively high voltage as used when applying the No. 14 a-c anodic treatment makes it advisable to install adequate safety precautions. Also the treatment tanks should be adequately ventilated. The method of ventilation and the protective devices employed should conform to any existing state and federal regulations governing the type of solution being used.

One recommended safety device is a masonite gate or curtain which extends across the tank and automatical-

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SPOILAGE goes down

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Exclusive! PROCUNIER "Tap Saver"

The exclusive Procunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap sheaths. Holds tap true.

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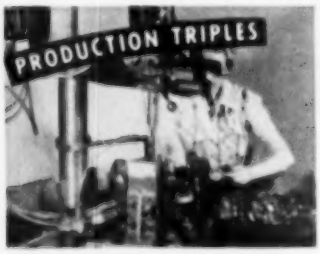
Doubles the Output
OF STANDARD MACHINE TOOLS

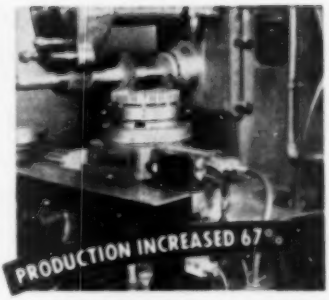
YOU can apply Bellows electrically-controlled Air Power to practically any manually operated machine tool in your shop to (1) feed work to the cutting tool, (2) hold it, (3) feed the cutting tool to and through the work. You can do all three automatically, each movement properly timed, precision controlled.

Experience of users everywhere proves you can double, often triple production from standard machine tools, with fewer rejects, less operator fatigue.

With Bellows "Controlled-Air-Power" units, your own tool room can convert your manually operated machine tools to fast automatic units, quickly, and at low cost.



Bellows "Controlled-Air-Power" installed on standard drill press to ream 7/16" hole, ¼" deep, jumps production from 700 to 2000 parts per hour



Bellows "Controlled-Air-Power" Rotary Work Feed Table feeds difficult part to milling cutter.

Bellows Air Motors, installed on standard lathe to feed tool stock and operate cross slide, reduce auto maker's costs 50%.

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ly turns on the current when it is closed and similarly shuts off the current when it is opened. This prevents workmen from getting near the tank when the power is on. It is also a good safety precaution to ground the anodizing tank during operation if it can be done.

Figure 5 shows power and control wiring diagram for the Dow No. 14 a-c Anodic Treatment utilizing 440v a-c. The electrical supply for the anodic treatment may be obtained from a standard 110, 220, or 440v alternating current source of sufficient capacity to accommodate the amount of work expected to be coated in each tank load. The voltage may be controlled manually over the desired range by the use of an auto-transformer or with an auto-transformer in combination with a fixed 440-120v transformer when a 440v line is used. A step-transformer designed to increase the voltage in 5-10v steps is also satisfactory.

In carrying out the anodizing operation the voltage is raised from 0 to 110-120v at a rate slow enough that the recommended current density 10 to 15amp./sq. ft. of total work area will not be exceeded. As the coating forms it becomes more resistant to current flow and the voltage must be gradually increased to build up the coating to the desired thickness.

The time required for treatment ranges from 5 to 20 minutes depending upon the current density and the alloy being anodized. The production man should keep in mind that the maximum recommended current density is preferred because of the shorter treatment time involved. The specific current density, used in the range of 10 to 15 amp./sq. ft. has no effect on the quality of the resultant coating. After a voltage of 110-120v has been reached, the electrical potential is lowered to 0. Breaking the current causes arcing.

Parts are removed and rinsed thoroughly in cold running water followed by a hot water rinse, to facilitate drying.

Waxing of anodized parts is recommended to reduce smudging due to excessive handling. Since the coating is quite absorptive, the wax tends to seal the coating. Anodized parts are dipped in wax emulsions or in organic solvent solutions of wax. Wax

(Continued on Page 60)

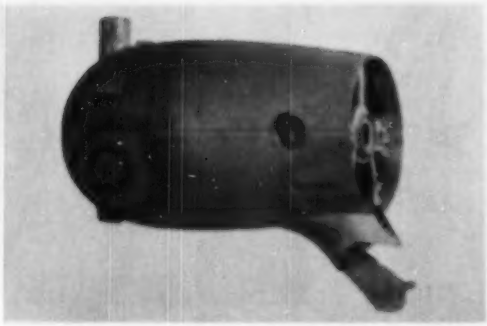


Figure 1. Damaged enamel has been stripped from the mixer body. Assembly has then been dipped partway in Luster-on Acid. Note contrast between round end, not yet dipped, where repaint will not adhere well, and open end where Luster-on treatment provides adhesion equal or superior to original phosphatizing.

Figure 2. Mixer assembly ready for repaint. Note that it is not necessary to disassemble steel base from zinc die-cast arm as bright dip does not affect the steel, and brass backing in base is brightened and preserved.

Bright Zinc Dip Used To Salvage Stripped Die Castings

By GUY SCHUMACHER
Vice-President and Works Manager
A. C. Gilbert Co.

IN OUR operations at A. C. Gilbert Company there are three places in particular where zinc base die castings, organic-finished, form prominent parts of finished products. The body of our kitchen mixer unit is first in volume and importance. The other two applications are fan housings and the locomotive bodies of our American Flyer line of miniature trains.

It is our general procedure to phosphate-treat the original zinc base die casting and then to apply the baked enamel finish. Since there are a number of assembly operations following the enamelling it is only reasonable that during this handling some paint injuries occur, and the finished product must be rejected because of chips or scratches in the enamel.

Unfortunately when the enamel was stripped from these rejects by an organic type paint stripper, the phosphating would not take over the stripped finish, and the reject would occur a second time. The problem was brought to our attention when it was noted that a large number of these rejects was being accumulated with no means for salvaging them satisfactorily. We had repeatedly submitted them to outside processors who had no solution either. Several thousand dollars worth of parts were headed for the scrap heap.

At this point our attention was brought to the use of the Luster-on Inhibited Zinc Bright Dip® on zinc base die castings as a paint base. Applying this suggestion to our problem of reject salvage a new procedure was worked out.

SIMPLE CYCLE FOR SALVAGING DIE CASTINGS HAVING DAMAGED ORGANIC COATING:

1. Strip Paint
2. Water Rinse
3. Activate Surface
4. Bright Dip
5. Repaint

The rejected parts are stripped in organic type paint strippers—an example being Kwikstrip—which remove the bulk of the paint film. In order to remove the residual paint film and to activate the surface for subsequent steps the parts are water rinsed and dipped for one-half to one minute in a hot solution of Pennsalt No. 20**. Next comes a 15 to 20 second dip in the Luster-on acid bath, followed by a cold and a hot water rinse.

At this stage the brightness is equal or superior to the original die casting. The finish is metallic and slightly yellowish iridescent. In repainting over this surface we have found that the adhesion is as good or better than on the original phosphate treated parts.

It is indicative of the success of this method to say that we have been using it at New Haven for nearly two and one-half years. Through this application of Luster-on Zinc Bright Dip we were able to salvage the large number of accumulated rejects on hand, and to cut losses from this source to a minimum in our daily production. There seems to be no reason why the same procedure could not be applied to any product where the repainting of die castings has been a problem.

Figure 3. White baked enamel gives a gleaming and durable finish to the Gilbert kitchen mixer.

*Luster-on is a product of the Chemical Corporation.

**Pennsalt No. 20 is a product of the Pennsylvania Salt Co.

CARBORUNDUM PROMOTES TWO

Sales assignments announced recently by The Carborundum Company include the appointment of John A. Decker, as sales manager for the New York district, and appointment of William J. Kingsley, as assistant sales manager of the Bonded Products and Grain Division, with headquarters in Niagara Falls, N. Y.

NEW TRICHLORETHYLENE PLANT

Completion of a large, modern trichlorethylene manufacturing plant at Ashtabula, Ohio, has been announced by Hooker-Detrex Incorporated.

The full production capacity of the new plant will be utilized in the manufacture of metal degreasing solvents for the Detrex Corporation, Detroit 32, Michigan.

It is expected that full-rated production capacity will be reached by November 1, 1950, thus assuring all contract customers of their requirements of degreasing solvents.

5 Basic Advantages

. . . plus proven design features and quality construction add up to big savings in . . .

Ettco-Emrick ADJUSTABLE SPINDLE MULTIPLE HEADS

Wherever they are used, Ettco-Emrick Adjustable Multiple Heads quickly pay for themselves many times over in terms of increased production and lower unit costs. Check these advantages, and you'll understand why.

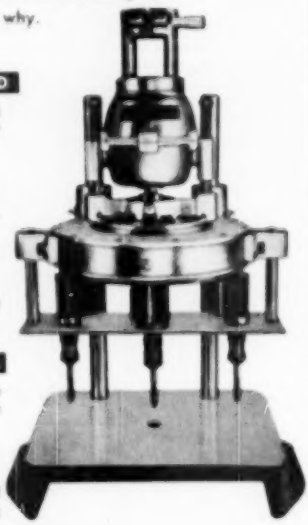
1 DRILL OR TAP WITH SAME HEAD
Quickly and easily converted from tapping to drilling—and back again—merely by changing face plate and chucks.

2 ACCURACY TO CLOSE LIMITS
Jig-bored template accurately locates spindles and prevents them from creeping.

3 FULL VERSATILITY
Spindles can be readily positioned to meet a wide range of hole combinations.

4 ENGINEERED FOR HIGHEST PRODUCTION
Head, workholders and fixtures are built to give highest possible production on your particular job.

5 LOW TOOLING COSTS
Fit any make drill press. Use of standard parts and methods reduces initial costs to a minimum.



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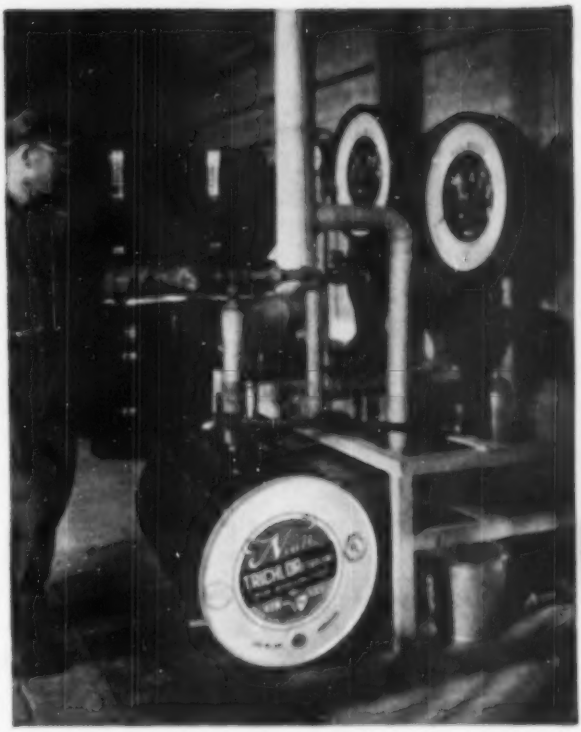

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Dental Company Finds Plating Is Practical on Aluminum Die Castings

ELECTRO-PLATING of aluminum has long been a problem because this metal does not respond satisfactorily to the usual procedures employed to prepare other metals for plating. This is due to the fact that the alloying metals in aluminum take several forms whose surfaces do not respond uniformly to various chemical and electrochemical treatments. Also presenting a problem is the ever-present natural oxide film which cannot be completely removed, but must be made thinner and more uniform.

One company which has enjoyed considerable success with electroplating of aluminum die castings is the Weber Dental Mfg. Co., Canton, Ohio, which not only chrome plates parts for use in their dental equipment, but also does job plating for other firms. The parts plated include cord arm joints and hinges that are die cast in Alcoa alloy No. 85, an alloy containing 5 per cent silicon and 4 per cent copper.

The company uses a variation of processes* recommended by the Aluminum Company of America, although specific details have not been revealed.

Standard procedure involves a "zinc immersion" coating as a preliminary to the electrodeposition of other metals. In this method, the casting is immersed in a highly alkaline proprietary solution of sodium zincate. The oxide film is removed from the aluminum surface to be plated and is replaced by a thin and adherent layer of metallic zinc. This provides a surface that will

THESE ALUMINUM DIE CAST PARTS have been chrome plated after a preliminary base plating operation. This process is carried on in production line quantities.

NEWEST DEVELOPMENTS IN METAL CLEANERS

DU-LITE NO. 31 & 37

FOR SUPERIOR METAL CLEANING

31

A highly efficient cleaner, especially for the electrolytic cleaning of steel and all ferrous alloys prior to electroplating. Also may be used as a soak cleaner or a combination of soak and electrolytic. Compounded exclusively by Du-Lite for removing grease, oils, and drawing and buffing compounds. Economical in use and in price.

37

Du-Lite has perfected this new all purpose cleaner to be used as a soak, electrolytically, or both in combination for all metals, except aluminum. Du-Lite No. 37 is especially recommended for the cleaning of stainless steel, steel, zinc, nickel plate and brass. Will not tarnish die castings or brass. Competitively priced.

Du-Lite Cleaners No. 31 & 37, products of the Du-Lite Research Laboratory, have been thoroughly tested on regular run shop work, and are backed by Du-Lite's long experience in metal cleaning and finishing.

Write for trial order or call for the Du-Lite field engineer to discuss procedures for your particular problem.

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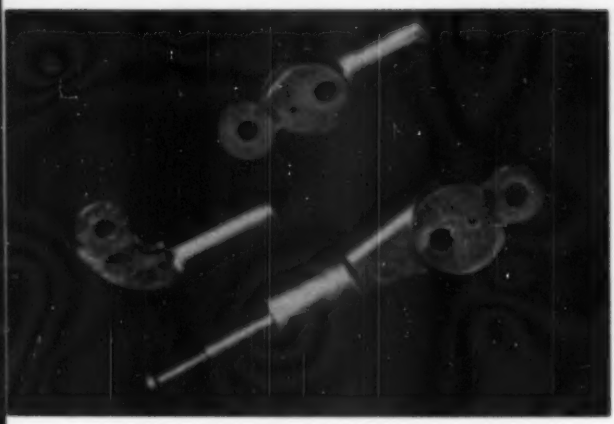

THE RAW ALUMINUM castings before plating operations are shown above. Note the steel insert in the cord arm joint which is plated with the casting.

respond to most of the plating procedures for depositing other metals.

Prior to the zinc immersion treatment, the aluminum must be cleaned, either by a vapor degreasing treatment or by a solvent cleaner. Further surface treatment is then required to remove the oxide film and remove any microconstituents that might interfere with the formation of a continuous zinc immersion layer or which might react with subsequent plating solutions. One of the more effective of several conditioning treatments is a hot acid etch of sulfuric acid.

Also having considerable merit is the double zinc immersion treatment in which the first zinc layer is removed by a nitric acid dip and replaced by a second and more easily plated layer.

Although chromium, and other metals, can be plated directly on the zinc immersion layer, it is ordinarily advisable to use a Rochelle-type copper cyanide solution to apply a thin copper layer. This is then followed by a nickel layer which, if not bright nickel, is buffed prior to the application of the chromium deposits. The resulting chromium finish is both a wear-resistant and decorative surface.

*These processes are listed in *"Procedures for Electroplating of Aluminum Alloys,"* a folder issued by the Process Development Laboratories of the Aluminum Company of America in New Kensington, Pa.

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NEW YORK, N. Y.

Pangborn Hydro-Finish CUTS HAND POLISHING OF DIES 60%

reports Mr. J. L. Crosby, General Manager

Shown here is the Pangborn Hydro-Finish unit which set new records at Fred Heinzelman & Sons. A pioneer of heat treated dies, the company reports Hydro-Finish removes heat treat oxide discoloration, cuts hand polishing 60% to 70%, holds tolerances to a precision .0001".

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Hydro-Finish is the answer to modern cleaning, decorating and finishing problems. As Fred Heinzelman & Sons have found, Hydro-Finish virtually eliminates tedious and expensive hand buffing and polishing on tool and die maintenance. Now, dies with heavy oxide discolorations can be cleaned faster and at lower cost.

And, on the production line, Hydro-Finish assures better bonding, electroplating, painting—gives you *the surface you want* within .0001" with no pits, grooves or hard-to-clean imperfections left after cleaning.

For full information on the many ways Hydro-Finish can save you money, write today for Bulletin 1400 to: PANGBORN CORPORATION, 1100 Pangborn Blvd., Hagerstown, Md.

Pangborn
BLAST CLEANS CHEAPER

FINISHING MAGNESIUM

(Continued from Page 54)

also can be applied in paste form, then polished.

If painting is to be the next step, waxing is omitted, and the anodized parts are immediately given a neutralizing seal by immersing them for 5 minutes at room temperature in a bath of the following composition:

Sodium dichromate ..... 6¼ oz./gal.
Sodium acid fluoride ..... 6¼ oz./gal.

After immersion, parts are rinsed in cold running water, then in hot water to facilitate drying. The "Manodyz" process is another commercial electrochemical treatment used for magnesium alloys[6].

Dow No. 12 anodic treatment[6] consists of an anodic treatment in a solution of the following composition:

Caustic soda ..... 2 lb./gal.
Ethylene glycol ..... 0.55 pints/gal.
Sodium oxalate ..... ⅓ oz./gal.
Temp.—165-175F.
Current density—Direct current—10 to 20 amp./sq. ft.
Alternating current—15 to 20 amp./sq. ft.
Voltage—Direct current—6 volts
Alternating current—6 to 24 volts
Anodizing time—15 to 25 min.

A suggested pretreatment for die castings is pickling for one-half to one minute in a solution consisting of 0.9 gal. of 85 per cent syrupy phosphoric acid dissolved in water to make one gallon. If the above pickling treatment does not remove the swirls and other surface marks it may be necessary to resort to sand, shot, or grit blasting prior to the pickle. Buffing or sanding after the pickling operation also eliminates this condition.

Parts to be treated should be suspended in the anodizing solution from three to five minutes before applying the current. This serves to remove all traces of foreign material from the surface and conditions the surface to receive the anodic coating. At the end of the treating time the current is turned off and the parts are allowed to remain in the bath at least two minutes to stabilize the coating.

Parts are then removed and rinsed for a minimum of five minutes in cold running water, followed by a hot water rinse to facilitate drying. Parts that are to be painted are given a neutralizing seal. Two solutions have been suggested for this step: One consists of a solution of 6¼ oz./gal. sodium dichromate plus 6¼ oz./gal. sodium acid fluoride; the other, is made up of ⅛ fl. oz./gal. syrupy phosphoric acid plus ⅔ oz./gal. of boric acid.

In using the first solution, parts are immersed for 5 minutes at 70F.; the latter solution is maintained at 105F. and parts are generally treated for five minutes.

ORGANIC FINISHES

Proper surface preparation and the choice of priming materials are two of the major factors that influence the satisfactory painting of magnesium parts. Most common paint troubles have their beginning at the point of contact between the primer and the metal surface; however, finish coats must also be chosen with care. Zinc yellow primer is widely used in many magnesium finishing operations. The purity of zinc yellow pigment used in primers for magnesium is important. Low chloride and low sulfate zinc yellows are desirable.

It is important that primers be carefully selected from the standpoint of adhesion to the magnesium surface coating. The thinner, vehicle, and

(Continued on Page 74)

THE BIAS BUFF

In the Die Casting Industry, our BIAS Buffs do a very good buffing job. At least that is what those who use them say.

Our BIAS Buffs are found to be highly efficient and extremely economical. This degree of excellence is achieved by combining very carefully selected material with highly skilled workmanship.

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AVOIDS 17 TAPPING OPERATIONS
Casco Products Corp. product engineers looked beyond smart appearance and trouble-free operation in planning the Casco Steam and Dry Iron. They recognized the economy and extra security of Self-tapping Screws for 17 fastenings. They also specified "Parker-Kalon" to make sure the planned savings would not be lost by screw failure and spoiled parts in production assembly. Nine P-K Type F Screws fasten internal parts to die-cast aluminum. Two P-K Type F and six P-K Type U Screws fasten external parts to the Bakelite handle. All screws are power driven. Type U Screws are driven three at a time in a power press.

Manufacturers of America's best-known products recognize that the actual cost of fasteners depends, never on price, *always* on performance. They know it's common sense to get the best Self-tapping Screws money can buy.

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A P-K Assembly Engineer will help you fit the right fastener to your needs, not your needs to a certain type—because P-K make a complete line. Find out why so many thousands of leading manufacturers say—"If it's P-K . . . it's O.K." Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y. Sold everywhere through Accredited Distributors.

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PARKER-KALON® SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY

NEW PRODUCTS

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

SYNTHETIC ENAMELS AVAILABLE FOR HOT SPRAYING APPLICATIONS

Although hot lacquers have been on the market suitable for spraying at a temperature of around 160F to bring savings in labor and materials in the finishing of metal products, it is only recently that synthetic enamels suitable for this type of application have been made available.

Atlas Powder Company has introduced a line of enamels which can be heated with any commercial paint heater and applied with standard air guns. The finish is reduced to spray viscosity by heat instead of thinner and permits the finish user to eliminate or substantially lower the expenditure for paint thinners.

For additional information circle No. 1 on the Reader Service card.

LOW-COST QUILL TRAVEL MILL ATTACHMENT

A low-cost quill travel vertical mill attachment for bench, light floor or heavy mills has been made available by Rusnok Tool Works. The trade name of this model is the Convertical.

This mill attachment allows full use of table travel and features quick, rigid angular settings both single and compound.

There are five spindle speeds, for speeds of 380, 700, 1200, 2500 and 5200 R.P.M. Quill travel is 1½". The Convertical has locking micrometer depth stop graduated in thousandths.

For additional information circle No. 2 on the Reader Service card.

SAFETY DEVICE FOR GAS-FIRED INSTALLATIONS PROVIDES INSTANTANEOUS SHUT-OFF

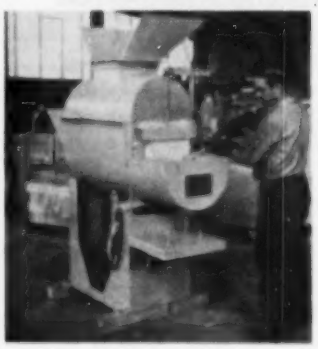
Instantaneous gas shut-off under any and all unsafe conditions is reported to be the outstanding feature of the new Lock-Tite Shut-Off Valve which is being offered by the Eclipse Fuel Engineering Co., Rockford, Ill. This unit is a positive safety device for use on gas fired installations.

The new valve can be supplied with electric solenoid for unsafe flame conditions or with diaphragm actuators to protect against failure of either low, medium or high pressure gas and air.

One of the advantages of the McKee Lock-Tite Valve that is designed to assure double safety protection is the manual reset feature. In case flame failure condition occurs, the solenoid valve becomes de-energized, causing the gas valve to snap shut and remain shut by a coil spring. The valve then can only be opened or reset by hand, and that can be done only after the unsafe condition has been corrected. This eliminates the possibility of the valve being accidentally or deliberately blocked open.

For additional information circle No. 3 on the Reader Service card.

FURNACE COMPLETE IN ITSELF FOR MELTING, HOLDING ALUMINUM



The Model "DS" furnace developed by the Stroman Furnace & Engineering Co. is a small flame or reverberatory type of aluminum melting furnace with a capacity of approximately 300 lbs. of molten aluminum and with an hourly output of from 200 to 300 lbs. of metal. The furnace meets the demand by diecasters and permanent mold plants for a furnace which is complete in itself for melting and for holding with continuous charging and continuous dipping from the furnace.

The furnace completely eliminates hot charging, doing away with the need for a breakdown furnace to transfer hot metal to the furnace, as well as eliminating the use of either crucibles or iron pots as a holding medium.

The furnace itself is made as narrow as possible in order to conserve space along the side of the die casting machine. It is built complete with a blower and with complete gas burning equipment. The furnace is gas-fired, operates on a reducing atmosphere and is easy to install, requiring only gas for the furnace and a power line to a small blower.

Down-time is also eliminated since there are no pots to break. Repairing and relining of the standard fire brick lining can be anticipated by several weeks.

For additional information circle No. 4 on the Reader Service card.

RUST PREVENTIVE OIL USES SPRAY APPLICATOR

A new type rust preventive oil and lubricant that is packaged in an Aerosol container for spray application to metal parts and fabrications in storage and production, guns, tools and implements has been introduced by the Mitchell-Bradford Chemical Co. of Stratford, Conn.

Called Gun Guard, the oil has excellent corrosion resistant characteristics and is ideal for industrial use since its spray application makes for both speed and ease of applications without lifting or moving items to be treated. Parts or assemblies either in storage bins or production line can be easily reached with the oil.

The oil itself is a polarized type and will displace any wetness or dampness on the metal surfaces resulting in longer corrosion resistance. Because of the spray application, the oil will reach areas, especially in assembled mechanisms, which are hard to reach.

For additional information circle No. 5 on the Reader Service card.

(Continued on Page 61)

DO ALL OF THESE PARTS WITH "ONE OPERATION" MASS PRODUCTION FINISHING AT A COST SAVING OF UP TO 95% WITH

ALMCO Supersheen
A Better Finish—FASTER

EQUIPMENT FOR YOUR SPECIFIC NEEDS

(1) Advanced Design PRECISION Tumbling barrels in sizes from 8" x 16" up to 60" x 30". (2) AUTOMATIC loading, unloading and separating equipment. (3) A vastly SUPERIOR grinding and finishing medium in 2 grades and 9 sizes.

DEBURR

Flat or formed stampings — **all** types and sizes . . . long, thin, slotted, etc. All common metals, including magnesium and copper. Machined parts with large burrs. Large, heavy or extremely light parts can be "one operation" processed without damage.

CUTTING DOWN, POLISHING, BURNISHING, PUTTING ON RADIUS

Castings — **all** types — **all** common metal alloys. Forgings before and after machining. Machined parts. Stampings requiring smooth surfaces and high colors.

DESCALE, DEBURR, POLISH

Forgings before and after machining. Heat treated parts. Welded or discolored parts.

COMPLETELY FINISH FROM CASTING OR FORGING TO PLATING OPERATION

Forged or cast brass, iron. Die castings of all sizes, shapes and types.

ALSO

Selective grinding. Low micro-inch surfaces equal to lapped finishes can also be obtained with absolute uniformity.

● GET THESE BENEFITS

A Better Finish Faster on widest range of parts. Reduced time, labor and material costs . . . up to 95% saving! Reduced rejections — stepped-up production. Unsurpassed uniformity — improved finish.

● OUR SERVICE TO YOU

We survey your requirements — determine by Trial Runs if ALMCO SUPERSHEEN is applicable. Furnish Engineering Data Card — specific fool-proof instructions on how to run each part. Train operators for highest efficiency. Furnish continuing information on latest finishing procedures.

FREE *Engineering Clinics*

Nationwide Network provides you with QUICKER and BETTER sample processing. Write today for details or send unfinished samples for FREE Engineered Pilot Run and complete production cost data.

FREE SAMPLE PROCESSING
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ALMCO DIVISION, Queen Stove Works, Inc.
Albert Lea, Minn., Dept: D-10

Please send me latest descriptive literature and address of nearest SUPERSHEEN Engineering Clinic.

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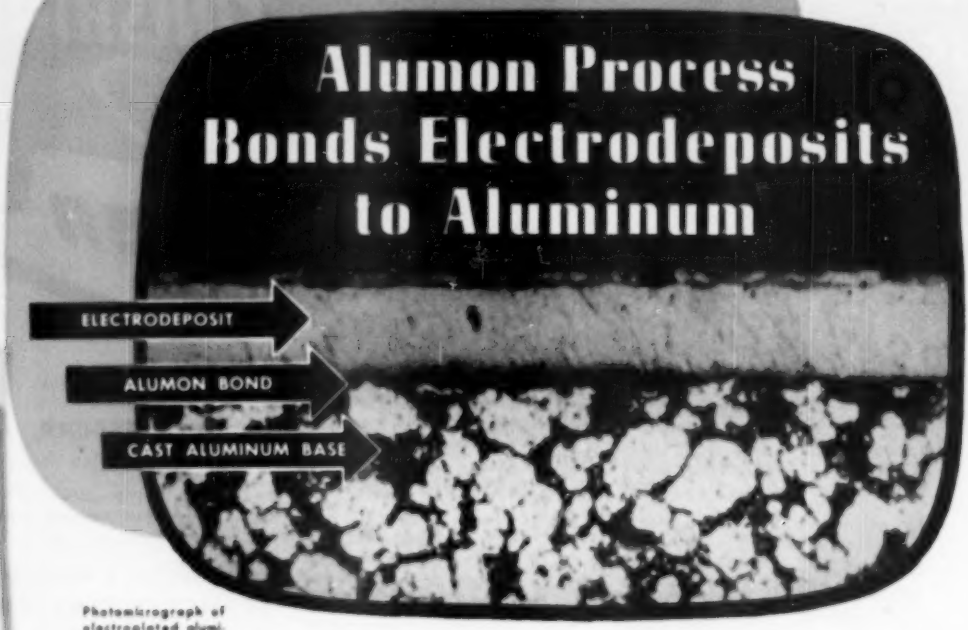
America's Most Versatile "ONE OPERATION" Finishing Process

Alumon Process Bonds Electrodeposits to Aluminum



Photomicrograph of electroplated aluminum showing high tensile Alumon Bond.

Hundreds of manufacturers throughout the United States are now using electroplated aluminum. The Alumon process is simple. The work is merely cleaned, dipped in acid, dipped in Alumon and is then ready for electroplating with copper, nickel, and other metals. The process is suitable for plating most wrought and cast alloys . . . The cost of using alumon is low, being less than half a cent per square foot of surface area treated. The process can be fitted easily into regular plating cycles. Write today for Alumon Process bulletin and technical data on how you can use electroplated aluminum for your products.

Enthone INC.

442 Elm Street, New Haven, Conn.

COATING GIVES CORROSION RESISTANCE TO ALUMINUM ALLOY SURFACES

A chemical, corrosion resistant type of coating, chemically deposited on aluminum alloy surfaces to provide maximum paint adhesion and paint durability is made by the Nailson Chemical Co., of Detroit, Michigan. Called Lylenite, the coating may be varied in thickness or weight where immediate painting of the aluminum surfaces is not performed, and where corrosion resistance may be desired for interim storage purposes.

According to the company, salt spray, humidity, water immersion and adhesion tests have proved the value of the coating on aluminum alloys. Laboratory findings on the product have been substantiated by field results and performances.

The coating is also claimed to be very effective for the treatment of magnesium alloys to prevent corrosion.

For additional information circle No. 6 on the Reader Service card.

COMPACT KIT CONTAINS SCREW THREAD INSERTS

A series of new and compact kits for the installation of Heli-Coil screw thread inserts has just been announced by the Heli-Coil Corp., of Long Island City, New York. Simplified kits are available and can be made up for industrial, aviation, automotive, marine and machine shop use. For maintenance, production work and field services the kits provide an assortment of inserts for screw threads from No. 6 to 1½ inches in coarse and fine series, as well as for spark plug and taper pipe thread sizes.

The kit pictured at left was originally designed for military field use and contains a tap, an inserting tool, a tang break-off and retrieving tool, a staking tool, an extracting tool and a supply of inserts for 14 mm. spark plugs.

For additional information circle No. 7 on the Reader Service card.

BRIGHT DIP FOR DIE CASTINGS

Great economy and ease of application feature the new Lustor-on Utility-15 bright dip for zinc die castings according to claims of the Chemical Corporation, Springfield, Mass. The dip can be used directly on castings to give maximum corrosion protection at low costs. The finish may be left a bronze tone or metallic clear. The bronze tone has high adhesive qualities for baked enamel or other organic finishes.

It is further claimed that on plated work the Lustor-on bright dip matches or surpasses the low cost of homemade yellow dips, but offer great advantages over these in control, firmness of deposit, especially when wet, and the ability to dry at high temperatures.

For additional information circle No. 8 on the Reader Service card.

HIGH SPEED CHROMIUM BATHS INCREASES OUTPUT

Unichrome Self Regulating High Speed Chromium Bath is of particular importance to the plant obliged to increase production or speed up production. The Unichrome S.R.H.S. bath is said to plate 20 to 80 per cent faster than the conventional chromium plating baths. As a result, existing equipment gains added capacity and unit production time is reduced.

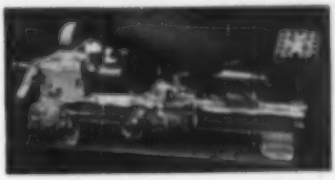
Three primary advantages are claimed over the conventional bath. 1.) Its cathode efficiencies are 1.5 to 1.2 greater. 2.) It has a wider bright plate range. 3.) It is self-regulating.

The bath is more foolproof as a result of its self regulating feature. Under normal operation, the catalyst concentration is automatically regulated.

For additional information circle No. 9 on the Reader Service card.

PRECISION TOOLROOM LATHE USES LESS POWER AND SPACE

A new line of small precision toolroom lathes is now being manufactured by the South Bend Lathe Works. Known as the "Light Ten," these lathes take work up to 10" in diameter over the bed. Swing over cross slide is 6¼", and distance between centers varies from 16½" to 28½", depending on bed length. Driven by a ½ h.p.



motor, ample power is provided for all work within the capacity of the lathe. The headstock is back geared, providing spindle speeds ranging from 48 to 1435 r.p.m.

Designed primarily for precision toolroom work, this new toolroom lathe is said to take less power and space than larger, heavier sizes and perform as well or better on work within its capacity. Large handwheels, micrometer graduated feed collars, and convenient controls reduce operator fatigue and help prevent mistakes.

It is delivered completely equipped with a precision lead screw having .0015", or less, lead variation in any one foot; a handwheel draw-in collet attachment (less collets); collet rack; taper attachment; thread dial indicator; thread cutting stop; large face plate; and a micrometer carriage stop.

For additional information circle No. 10 on the Reader Service card.

"RING-SEAT" CENTER DRILLS FOR HEAVY DUTY WORK

Link Engineering Company of Detroit has enlarged its line of "Ring-Seat" center drills to include heavy duty type "S" in 13 sizes from 3/64 to 5/16 drill diameters.

Because of its chord-curve design with a preformed 60 degree bead followed by an 82 degree flare, there is no sharp angular fatigue point between tip section and center forming section.

This heavy-duty type is designed for heavy production parts, especially castings and forgings. The 82 degree angle above the bearing bead enables the drill to be used as a countersink where rivets, flat and oval head machine screws are used. For this purpose it is

a speedy one-operation tool. The 82 degree flare also automatically produces a safety center, with easy lubrication.

Like the standard model, the heavy-duty type has a tip diameter slightly larger than the body of the tip section, providing clearance behind the tip, thereby reducing tip breakage and giving a longer wear period. Tip breakage is further reduced by the spiral flutes which facilitate the easy flow of chips and eliminate chip jamming which is a common cause of tool breakage.

For additional information circle No. 11 on the Reader Service card.

SELF-CENTERING CHUCK HAS BUILT-IN ADJUSTMENT

A self-centering chuck with built-in adjustment for .0005 accuracy has been introduced by the Huck Tool Company of Kalamazoo, Michigan.

Called the "Ajust-Tru" chuck, it is reported to provide the

What should a PRODUCTION TOOL do for YOU...?

WHAT MUST IT DELIVER TO WARRANT THE EXPENSE?

It Must Amortize Itself Rapidly, then Pay Dividends in Increased Production

DETROIT
POWER
SCREWDRIVERS

A GREAT CONTRIBUTION TO TIME AND LABOR SAVING

They replace the slow, dragging tempo of hand methods with the almost incredible speed of their mechanical operation, resulting in tremendously increased production, greater economy and stepped-up profits. They drive all types of screws: standard and special heads, Phillips heads and slotless heads. Driving time one to two seconds per screw . . . Uniform tension . . . No marring of heads or stripping of threads. **Screws always in sight of operator.** Let our experience as specialists in assembly problems serve your interests. Send sample assembly with screws for production estimate and prices on equipment to do your job by this modern, dividend paying method.

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DETROIT POWER SCREWDRIVER CO.

2821 W. FORT ST. DETROIT 16, MICH.

flexibility and speed of scroll chucks and the precision of 4-jaw independent chucks.

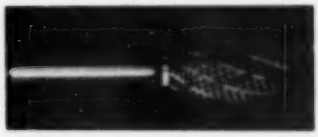
Jaws of the chuck, either three or six jaws, go in or out to grip the work like a scroll chuck. Precise adjustment is made by four opposed fine-threaded screws operating between the chuck body and its adapter.

The company claims that an inexperienced operator can adjust to within .0005 in three minutes.

Ajust-Tru chucks are made in 4", 5" and 6" diameters. There are three models: three and six step-jawed chucks with external and internal jaws and a six-jawed chuck for external grip only.

For additional information circle No. 12 on the Reader Service card.

DEEP-FLUTED CARBIDE BURS



To provide the operator with better control of carbide burs, the relatively new diamond-cut design of Pratt & Whitney carbide burs, called Di-Bur, has been further improved by deepening the flutes at specified intervals. Flutes are ground in solid blanks and run true with the shank, eliminating the "hop" or "jump" so damaging to carbide. The result is efficiency and accuracy when shaping and finishing all kinds of materials.

The burs are made in all regular shapes and sizes, and in three types of cut: fine, standard and coarse.

For additional information circle No. 13 on the Reader Service card.

GRAPHITE POWDER MAKES LOW COST DIE LUBRICANT

A new "clean" powder lubricant, silver in color and called "Graflex" is now being offered to the die casting industry by Reardon Products of Peoria, Illinois. When added to kerosene the powder lubricant makes a low cost die lubricant that is sprayed on with a conventional nozzle attached to an air hose. Actual users of the product report bright, shiny castings, increased production and ideal lubrication.

The lubricant has a variety of other uses, including use when turning, threading, broaching, reaming, drilling, milling, grinding and spinning. It also can be used for deep drawing, forming and blanking of mild steel, copper, brass, aluminum and zinc.

For additional information circle No. 14 on the Reader Service card.

HAND AND POWER-DRIVEN MACHINES MARK DIE CAST AND MOLDED PARTS

Specialists in marking equipment, the Acromark Co. produces a variety of hand-operated and power-driven machines for painting, marking and stamping die cast, cast, stamped and plastic mold parts.

Among these is the Acroprinter, left, a hand-operated machine which applies color enamel filling into recessed letters and designs, and Acromark No. 56, a fully automatic machine that applies enamel to raised lettering and designs on die cast embossed metal and molded plastics parts.

For additional information circle No. 15 on the Reader Service card.

STRIPPER REMOVES METALS FROM COPPER AND BRASS

Rapid stripping of nickel, tin, lead and chromium from copper, brass and other copper alloys without attack upon the base metal is offered by a metal stripper, N-165, made by Enthone, Inc., of

"Buffing Compound Removal is a Tough Job!!!"

● That's the title of the booklet describing in detail Cowles' remarkable new companion products designed especially for removal of buffing compounds from die castings.

Cowles SO Cleaner has superior penetrating and wetting action quickly to loosen ground-in dirt and impacted buffing compounds. SO can be used in still tank, fully and semi-automatic machines and is compatible with a wide range of temperatures. Because SO produces stable emulsions at low concentrations, it assures thorough rinsing.

Cowles ZN Cleaner effectively removes these stubborn soils in the electrolytic tanks. ZN is an alkaline cleaner formulated with synthetic detergents and sequestrants to assure optimum detergent potential under all water conditions.

Here is a combination for loosening and removing buffing compounds *which really works!*

COWLES CHEMICAL COMPANY
METAL CLEANER DEPARTMENT
7016 Euclid Avenue • Cleveland 3, Ohio

The Booklet gives you complete information—send for it today. The coupon is for your convenience.

COWLES CHEMICAL COMPANY
7016 Euclid Avenue
Cleveland 3, Ohio

Please send me your folder "Buffing Compound Removal is a Tough Job!!!"

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Company _____

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New Haven, Conn. The work revolves on current. The work to be stripped is simply immersed in an acid solution containing the stripper and rapid removal of nickel and the other metals mentioned is accomplished. Stripping rates as high as .006 per hour of nickel are claimed by the company.

The process is stated to be ideal for removal of nickel from bulk plated work as well as heavier plated objects, such as flashlights, plumbing goods and other items made of copper. It is also suitable for rapid removal of nickel and chromium from tips of plating racks, thus reducing maintenance costs on plating racks.

The process is a simple one to use. The stripper is added to the acid solution and stripping can be accomplished at room temperature or higher temperatures if faster stripping is desired.

For additional information circle No. 16 on the Reader Service card.

ROTARY AND STRAIGHT LINE AUTOMATIC POLISHING-BUFFING MACHINES

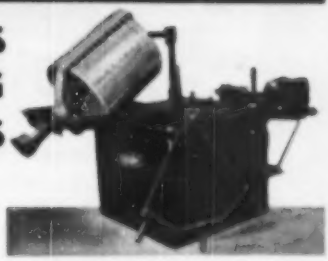
For polishing and buffing on a high volume basis, automatic machines are built by the Acme Manufacturing Company of Toledo, including rotary and straight line types to suit the specific job.

Being demonstrated at the National Metal Show are the Acme automatic horizontal return straight line machine shown above, as well as an automatic indexing rotary machine not shown here.

The horizontal return straight line machine is a versatile ma-

DANIELS PLATING BARRELS

Produce MORE Work Per Day in Your Plating Plant



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- No Overhead Devices
- No Solution dumping
- More DC Current on Work
- Good Solution Circulation
- Many Sizes to meet all Production Requirements
- Lowest Maintenance

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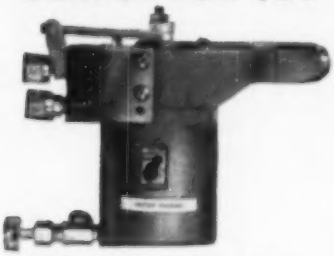

USE A NEW MEAD PNEUMATIC DRILL

This simple, inexpensive device quickly converts standard drill presses into semi-automatic machines — increases production substantially on suitable jobs; double or more in some cases.

Clamps to spindle quill in a few seconds. Automatically closes air feature on work. Affordable feed control and break — through cushion. Quick return. Easy to synchronize with automatic cycle equipment.

Air-Power does it quicker, cleaner, better. Write today for latest complete catalog.

PRESS FEED for DRILLING REAMING TAPPING

MEAD SPECIALTIES COMPANY

4114 NO. KNOX AVE., DEPT. DC-100, CHICAGO 41, ILL.

Oakite's New FREE Booklet on Paint Stripping

WHAT'S THE BEST WAY TO STRIP PAINT FROM METAL PARTS TOO LARGE TO BE SOAKED IN TANKS? See Page 3

answers many questions that will lead you to better stripping procedures. You'll want to read more about:

What's the best way to strip large areas of structural metal where a steam supply is available? *See page 3.*

What's best when steam is not available? *See page 7.*

What is the cheapest way to strip metal parts in large volume? *See page 9.*

What are the best ways to prepare stripped surfaces for repainting? *See page 11.*

What strippers are best for removing oil-base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints? . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas? *See page 12.*

FREE For a copy of "How to STRIP PAINT" write Oakite Products, Inc., 36G Thames Street, New York 6, N. Y. No obligation.

Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS · METHODS · SERVICE

Why Luster-on® for Zinc Die-Castings

Greatest Corrosion Protection at Lowest Cost

is secured with a simple cold dip of the castings in new Luster-on UTILITY-15. May be left in pleasing bronze tone or leached to a satin-finish. Ideal adhesive base for organic finishes.

Maximum Brilliance with Positive Control

is secured when die castings are first ZINC PLATED and then processed in Luster-on UTILITY-15. Gleaming finish is permanent — unaffected by handling, age or white corrosion products.

IF YOU ARE NOW USING A HOMEMADE YELLOW DIP

you will find many advantages in switching to Luster-on UTILITY-15. Surface is not mushy when wet, parts may be dried in high heat without damage, control of the finish is accurate — results uniform. Yet on PLATED work costs are no higher than cheapest yellow dip — on direct application to castings only slightly more for better results.

Suggested Applications of Luster-on to Die-Castings

No Leach — No Plate: Carburetor and Fuel Pump parts, machine bases, special bushings and any part to be organic finished.

Plated and Leached: Card hardware, padlocks, tools, electrical parts and 1618 other items.

Let your imagination go on this!

Send for full details today . . .

New* Luster-on® *Utility-15

Manufactured and distributed in Canada by
ALLOYCRAFT LIMITED
27 Hillside Ave., Westmount, Montreal 6, P. Q.

THE Chemical CORPORATION
54 Waltham Ave., Springfield 9, Mass.

THE CHEMICAL CORPORATION
54 Waltham Ave., Springfield, Mass.
Please send me full particulars about Luster-on Utility-15 for zinc die-castings. I am (am not) sending sample for free dip. No obligation, of course.

Name .....
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chine adjustable to many types of work. It is equipped with 180 camming type fixtures which automatically position the work against backing plates at the correct angle to each successive wheel in the finishing sequence.

For additional information
Circle No. 17 on the Reader Service card.

NON-FLAMMABLE HYDRAULIC FLUID FOR DIE CASTING SAFETY

A non-flammable hydraulic fluid called Lindol which is reported to be non-oxidizing, non-corrosive, non-volatile, odorless and non-toxic is manufactured by Celanese Corporation of America.

Elimination of the danger of fire hazard is claimed for this material which has been used in die casting machines of major producers for the past six years.

Lindol is a stable, oily chemical compound having desirable lubricant qualities. Tests have indicated a film test of approximately six times that of a lubricating oil having the same viscosity characteristics.

For additional information
Circle No. 18 on the Reader Service card.

POWER BRUSHING SMOOTHS SURFACE OF AUTO PARTS

By power brushing—primarily for cut, a large producer of automotive parts has been able to increase production of stainless steel division bars for automobile windows to over 6,000 a day, and still report cash savings.

This saving and increased production stems from the use of a power brush section produced by the Osborn Manufacturing Co. of Cleveland. An Osborn Monarch Tampico Section is used to smooth out polishing marks, brighten and prepare the surface for final color buffing.

The equipment is a 14-head in-line. The automobile window divider bar is placed in a holder which moves on a continuous chain through the polishing line.

The first four heads are Osborn Monarch Tampico brushes used with abrasive. The last three stations are buffs run at 4,000 revolutions per minute with sprayed abrasive.

At this point, the divider bar is finished on one side. The holder automatically rolls over and moves under the second set of seven heads so as to polish the other side. At the end of the line, the bars are removed and placed on a conveyor rack which carries them through a Solventol bath. The parts are then dried and masked to prevent surface injury.

For additional information
Circle No. 19 on the Reader Service card.

(Continued on Page 71)

AUTOMATIC BURNISHING MACHINE HAS WEAR-RESISTANT BARREL

A new development in equipment for wet ball burnishing and polishing, a completely automatic Tumb-L-Dur burnishing machine, is being manufactured by Lapomatic Industries of New York City. Most important feature of this new machine is the molded barrel that has an exceptionally long life. The service that would wear out a wood barrel in 3½ to 4 weeks has not affected a Tumb-L-Dur barrel in use for more than a year and a half, according to the manufacturer.

Another important advantage claimed for the new barrel is its ability to resist warping. Barrels made of this material may be kept out of water when not in use, without damage. Because of Tumb-L-Dur's extra strength, thinner barrel walls can be used with a resulting increase in work capacity.

For additional information circle No. 20 on the Reader Service card.

OFF-CENTER FLUTE DESIGN GIVES 4-WAY ROTARY TOOL

An off-center flute design has been used by the M. A. Ford Mfg. Co. to produce a new 4-way rotary tool that is said to be fast, economical and chatterless for countersinking, chamfering, burring, valve seat finishing and center reaming.

The "Quad" countersink operates at speeds of from 25 to 75 sfm and produces a fine finish when operated dry at relatively low speeds. Use of a water-soluble coolant is recommended, however, for top quality finishes.

For additional information circle No. 21 on the Reader Service card.

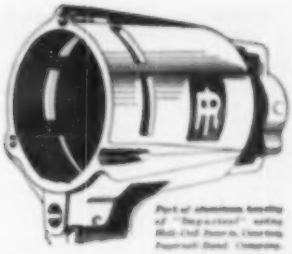
(Continued on Page 72)

LYFANIZING of Aluminum alloys provides thousands of hours of resistance under salt spray and humidity tests conducted under A.S.T.M. Requirements. Meets the requirements of Military Specifications MIL-C-5541-Chemical Films for Aluminum and Aluminum Alloys.

Send for LYFANITE BROCHURE 4998 and SAMPLE PANEL

NEILSON CHEMICAL CO.

Windsor, Ontario **6563 Benson St., Detroit 7, Mich.** Los Angeles, Calif.



HOW TO MAKE BETTER... CHEAPER DIE CASTINGS

It is easy to simplify design and effect impressive economies in all die castings by the use of Heli-Coil® Screw-Thread Inserts.

These precision-formed threads of stainless steel or phosphor bronze wire offer these major advantages:

1. They add great strength to the threads in the parent metal . . . permitting smaller thread holes and reduction in boss size.
2. They provide permanent, positive thread protection . . . prevent damage from high torque and vibration.
3. They eliminate corrosion, galling and seizure.

Simple addition of these 3 advantages equals . . . better end product . . . less field service . . . complete customer satisfaction.

Heli-Coil Inserts fit all National Coarse and Fine Thread Series . . . also spark plug and pipe thread sizes. They meet all specifications for military, industrial, automotive and aviation use.

Please send me new Bulletin No. 650—Design and Specification Data.

HELI-COIL CORPORATION

Heli-Coil Corporation
47-97 Thirty-Fifth Street, Long Island City 1, N. Y.

Please send me new Bulletin No. 650—Design and Specification Data.

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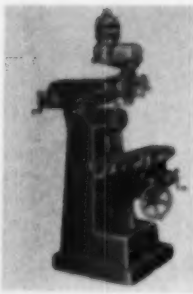
MILLING MACHINE DESIGNED FOR MULTIPLE OPERATIONS



A new universal ram, turret type, vertical milling machine is announced by the Fray Machine Tool Company, Glendale, Calif., manufacturers of "All-Angle" milling machines and milling attachments. Any angle or compound angle can be completed without changing the original work set-up. Hence, it is claimed, work moves faster and costs less because changing the machine is faster and easier than resetting the work.

Combining the features of several machines, the new Fray No. 10-R is an all-purpose milling machine especially suited for a wide variety of operations on a single piece of work. Machining operations can be done at any angle in either or both the vertical and horizontal planes. (For universal vertical and regular horizontal milling, makers recommend the Fray No. 10-RH.) Milling, drilling and boring operations can be done at any angle, longitudinally by traversing the ram on the turret slide, or crosswise by operating the ram in its saddle.

For additional information circle No. 22 on the Reader Service card.

"FLOATING DRIVE" GIVES SMOOTHER DRILL PRESS OPERATION

A spindle head bearing design with four large precision ball bearings gives a "floating drive" which is the outstanding feature of Atlas drill presses.

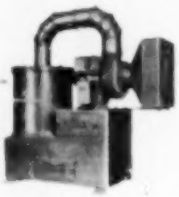
New models have massive grey iron head, table and base and extra-thick ground steel drive sleeve. Manufactured in both floor and bench types, these drill presses are available in high or slow speed models with No. 7B to ½" Jacobs chuck or No. 1 or No. 2 Morse taper.

Among specifications for the floor model are: Drills to center of a 15" circle; Maximum distance of 41" between table and chuck; Spindle travel 4"; Overall height 66".

For additional information circle No. 23 on the Reader Service card.

Why it pays to SPIN-DRY plated work—small lacquered parts

Choose from 3 carefully engineered models...



1. **Standard Model.** Takes nearly every type of part. Built for long, trouble-free service.

Saves time ... With the New Holland Kreider Dryer operating at 625 r.p.m. on only ¼ h.p. you can spin-dry a basket of parts (1140 cu. ins.) in as little as 35 seconds—no more than 2 minutes.

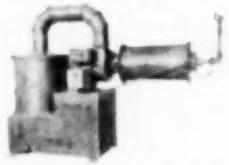
Improves quality ... With a New Holland Kreider Dryer, high speed centrifugal spin-drying eliminates scarring and marring, assures smooth evenly dried surfaces, with longer lasting luster ... fewer "rejects."

Cuts costs ... What's more, though a New Holland Kreider Dryer occupies less than 6 sq. ft. of floor space, it's a big money saver. Power costs are low, production high—with little or no maintenance over years. And one man can operate it, easily, efficiently.

See for yourself. Write Department PI. D-100 today for illustrated 4-page folder ... also addresses of installations near you.

New Holland Machine Co., New Holland, Pa.

2. **With Auxiliary Steam Heating Unit.** Used for small parts that hold moisture—lacquered parts—or where cold water rinse is used.



3. **With Auxiliary Gas Heating Unit.** Used for small parts. Caution: Do not use with inflammable materials.

NEW HOLLAND KREIDER DRYER

R. PEACOCK HEADS SALES

R. Peacock, manager of dairy industry sales for The Diversey Corporation since 1948, has been named sales manager of General Reduction Company, a Diversey subsidiary, by Chairman H. W. Kochs of The Diversey Corporation.

CHEMICAL SOCIETY ELECTS

Dr. Gustavus J. Esselen, vice president of the United States Testing Company, Inc., was recently elected vice president of the Society of Chemical Industry which maintains its headquarters in London, England.

APPOINT SALES HEAD

Cara L. Lane, general manager of the Walker-Turner Division, Kearney & Trecker Corporation, Plainfield, N. J., recently announced the appointment of Lawrence H. Russell to the position of sales manager of the Walker-Turner Division with headquarters at Plainfield.

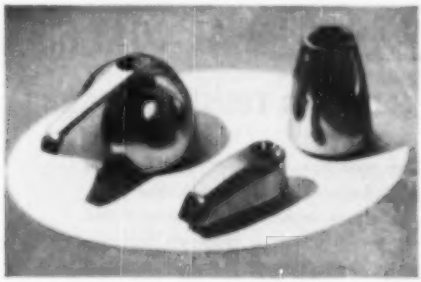
Mr. Russell comes to the Walker-Turner Division with ten years of experience in the power tool field, three years as sales manager of the Power King Division of the Atlas Press Co.

PREVENT Blistering, Streaking
on zinc-base die-castings

with DIVERSEY No. 505

Sensational NEW
ELECTRO-CLEANER AND SURFACE CONDITIONER!

Actual photograph of blistering on zinc die casting cleaned with conventional cleaner.



Actual photograph of finished zinc die castings cleaned in new Diversey No. 505.

Designed especially for reverse current electro-cleaning of zinc-base diecastings, *new* Diversey No. 505 completely, *safely* removes all unwanted deposits! In addition, Diversey No. 505 helps condition the surface of the zinc, providing better adhesion between the electro plate and the base metal!

This unique, double-action of Diversey No. 505 helps provide a uniformly clear, brilliantly lustrous finished surface . . . one free from blistering, peeling and streaking! Diversey No. 505 is economical, easy to use and available now! Investigate Diversey No. 505!

VISIT DIVERSEY'S EXHIBIT
National Metal Exposition
International Amphitheatre,
Chicago, Illinois
October 23 - 27
Booth No. 619

THE DIVERSEY CORPORATION
Metal Industry Department
1820 ROSCOE ST., CHICAGO 13, ILL.

THE DIVERSEY CORPORATION
METAL INDUSTRY DEPARTMENT
1820 Roscoe St., Chicago 13, Ill.

Gentlemen:
Please send me complete information on *new* Diversey No. 505.

Name_____
Title_____
Company_____
Address_____
City_____ State_____

ALUMINUM INDUSTRY HAILS NEW, LOW COST FINISHING PROCESS

Aluminum fabricators say IRIDITE® AL-COAT fills long-sought need for non-electrolytic corrosion resistant coating

Now you can apply a clear protective Iridite film to mill or buffed aluminum surfaces in as little as 10 seconds . . . without changing the appearance of the metal. Or, a highly protective yellow colored film can be produced from a one to two minute immersion.

Since its introduction, Iridite Al-Coat has been widely acclaimed for its ease and speed of application, superior corrosion resistance and low cost. Because of its simple operation, Iridite Al-Coat is replacing more complicated and expensive electrolytic processes for providing a corrosion resistant final finish or paint base for aluminum surfaces.

Write or wire direct, or ask your Iridite representative for full information and samples. Or, send us a sample of your product for test processing.

Here's Why It's Best For You . . .

APPLICATION — *Dip, spray or brush* . . . **ONE SOLUTION** — *No heat or current — single dip* . . . **FAST PRODUCTION** — *Few seconds to 2 minute immersion* . . . **CORROSION RESISTANCE** — *Up to 1,000 hours salt spray on wrought stock, 250 hours on castings. Meets all military specifications* . . . **ABRASION RESISTANCE** — *No flaking or peeling from buffing, bending or scraping* . . . **PAINT BASE** — *Blocks underfilm corrosion* . . . **APPEARANCE** — *Color selection — clear or yellow* . . . **WELDABILITY** — *Can be spot welded, inert shielded arc welding* . . . **CONDUCTIVITY** — *Low surface electrical resistance* . . . **LOW COST** — *SAVES UP TO 50% OVER OTHER PROCESSES*

ALLIED RESEARCH PRODUCTS, INC.

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BALTIMORE 5, MD.

REPRESENTATIVES IN PRINCIPAL INDUSTRIAL CITIES; WEST COAST—L. H. BUTCHER CO.

MANUFACTURERS OF IRIDITE FINISHES FOR CORROSION RESISTANCE AND PAINT SYSTEMS FOR NON-FERROUS METALS; ARP PLATING CHEMICALS

USEFUL LITERATURE

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

25 BAKED PROTECTIVE COATING FOR ALUMINUM:

A new baked finish has been introduced by Standard Varnish Works to protect aluminum surfaces. This coating may be applied by spraying or dipping, must be baked 15-20 minutes at 275-325F., has high abrasion resistance approaching metal-hardness, and is reported to be resistant to acids, alkalies and solvents.

26 HEAT TREATING OVENS IN STANDARD AND SPECIAL DESIGNS:

Standard and special designs of heat treating ovens are presented in a 12-page folder offered by Young Brothers Company of Cleveland, Ohio. Ovens in three categories are included: batch type, pit type and continuous conveyor type. Annealing, stress relief, normalizing, drying, shrink fitting and hydrogen relief after plating are among the uses for these units.

27 TAPPING AND FILING OPERATIONS ON ALUMINUM:

Section 6 of their manual on machining of aluminum alloys is contained in the current issue of the Reynolds Metals Technical Advisor. Described and illustrated are sections on tapping and filing aluminum. A table of recommended tool angles and typical tool designs is included.

28 DATA BOOK ON RETAINING RINGS:

The full range of uses for which internal and external retaining rings may be applied is suggested in a well-organized data book published by Waldes Kohinoor, Inc. A drawing of each type of retaining ring is accompanied by design features and technical data, plus a series of sketches of typical applications. General specifications of materials and finish are also included.

29 PLATING RACK PASTE:

A paste type insulating material for hooks, fixtures, jigs and baskets used in electroplating, is the subject of a folder from Nelson J. Quinn Co., Toledo. The material, Runatol 1002, is thoroughly described and the methods of applying it are also covered.

30 PROTECTION OF AIR-POWERED TOOLS FROM AIR-BORNE IMPURITIES:

Bulletin No. 176 published by R. P. Adams Co., Inc., Buffalo, N. Y., is devoted to the protection of air-powered tools, gauges and process equipment from air-borne impurities. The bulletin describes equipment for removing water, oil and scale from compressed air systems.

31 TABULATION OF LACQUER SOLVENTS, DILUENTS:

A 4-page folder that lists all important properties of lacquer solvents, diluents and plasticizers in tabulated form is available from the Shell Chemical Corp. The folder, which can be inserted in shop notebooks, also has a temperature conversion chart and shows the graphic relationship of solvent properties.

32 REFERENCE LIST OF PROTECTIVE COATINGS FOR METALS:

American Chemical Paint Co. offers a quick reference list of metal protective and paint bonding chemicals and processes.

33 HIGH SPEED HEAD TAPPING

The Procunier Safety Chuck Co. has available an illustrated brochure giving details on the Procunier high speed tapping head. The product is said to maintain clean, sharp threads, while reducing the number of broken taps.

34 EMULSION CLEANER IS SAFE FOR PLATING ROOM USE:

A newly developed emulsifiable solvent cleaner which is especially useful for removing buffing composition from zinc base die castings and for precleaning steel prior to plating, is the subject of a folder issued by Enthone, Inc. Called Enthone Emulsion Cleaner 75, it is reported to be safe for use in the plating room.

35 DATA ON BEARING METALS:

Two more in a continuing series of publications on products of Federated Metals Division are now available. These are leaflets on Federated XXXX nickel babbitt and Merit metal babbitt. The first of these is a tin base alloy of high hardness and ductility useful for heavy loads; the second is a lead base alloy.

36 MULTI-COLOR ENAMEL IN A SINGLE COAT:

A multi-color finish which makes it possible to apply two or more colors in a single coat has been introduced by United Lacquering Corp. of Linden, N. J., who have issued a set of color samples. The new enamel is available initially in 16 color combinations.

37 DEBURRS, ROUGHENS, HARDENS DIE CAST SURFACE:

How to remove burrs from die castings, roughen the surface for good paint adhesion and work-harden the surface for greater density in a single operation is the subject of a new booklet issued by American Wheelabrator & Equipment Corp. The machine for accomplishing these objectives is an airless metal cleaner that operates by throwing abrasive from a rotating, bladed wheel.

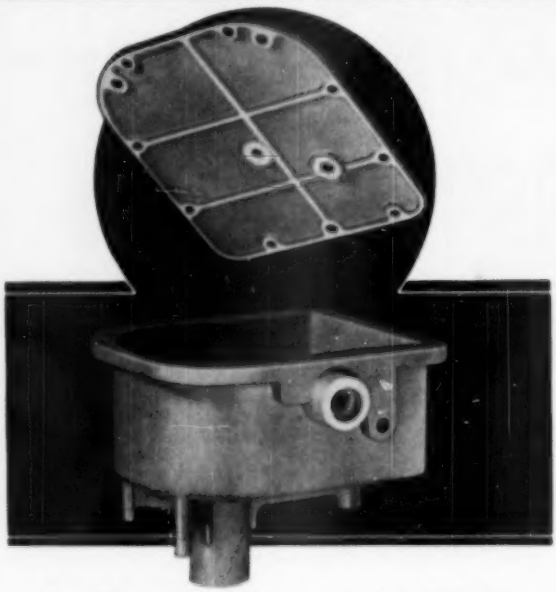
REYNOLDS METALS CO. PICKS INDUSTRY MANAGER

John E. Blomquist has been appointed industry manager, Industrial Parts Division, Reynolds Metals Company, it was announced recently by W. G. Reynolds, vice president and manager of Reynolds Parts Division, Louisville, Ky.

Mr. Blomquist graduated from University of Kansas City with an A. B. degree in 1938. He also has attended Wharton School at the University of Pennsylvania and Case School of Applied Science in Cleveland.

In 1940, Mr. Blomquist came with Reynolds Metals as sales representative for the Foil Division in the Kansas City Office and was made district manager in that location in 1942. During 1943-45 he served in the U. S. Navy as officer in charge of raw material procurement and stock maintenance for the Naval aviation supply system.

Mr. Blomquist returned to Reynolds in 1946 as district manager of the Akron, Ohio, office of the Aluminum Division. From October 1946 to his recent transfer, he served as division manager of the Philadelphia office.



GEAR HOUSING *and* COVER

Like Confucius we believe that one picture is worth a thousand words. You have to see "Cleveland" Die Castings to really appreciate them.

Coupled to dimensional accuracy and the fine finish of "Cleveland" castings is close cooperation with your engineers.

Yes—Every "Cleveland" Job Is Important

DIE CASTING DIVISION
The Cleveland Hardware & Forging Co.
Established 1907
3256 E. 79 ST. CLEVELAND 4, OHIO

OPPORTUNITIES

DIE CASTING ACCOUNT WANTED

By Salesman with long established clientele on sand castings in Detroit & Lower Michigan. Box 10150

FOR SALE DIE CAST MACHINE

Kux Model BA-12 air operated zinc Die Casting Machine. Between bars 12¼x12¼. Dies separate 8". Machine in good condition, complete with spare goosenecks. Box 10250

T. H. PICKERING RESIGNS

T. H. Pickering has resigned as vice president of the Doehler-Jarvis Corporation after 20 years with the organization.

Mr. Pickering was president of the Metal Mold Casting Company until 1929 when it was purchased by the Doehler Die Casting Company. In 1936 Mr. Pickering became sales and office manager for the Batavia plant of the Doehler company and in 1937 was promoted to the position of plant manager.

His advancement to become vice president and general manager of the Batavia plant in 1940 was followed in 1944 by a shift to the New York office of the company where, as vice president, he was put in charge of sales promotion. At the time of his resignation, Mr. Pickering was on special assignment in connection with sales promotion in Chicago.

Mr. Pickering resides at 641 Glendale Drive, Glenview, Ill.

NEWS OF THE INDUSTRY

E. J. BASCH NAMED V.-P. BY WESTERN DIE CASTING

At a recent meeting of the Board of Directors of Western Die Casting Company, E. J. Basch was elected vice-president in charge of production. Mr. Basch became associated with the company earlier in the year, having formerly been with Doehler-Jarvis Corp. in New York.

At the same meeting, Miss Jane Leland was appointed to the newly created post of controller. Western Die Casting Company is located in Emeryville, California.

LATROBE STEEL NAMES NEW PHILADELPHIA MANAGER

Louis M. Teich has been appointed branch manager of the Philadelphia office and warehouse of the Latrobe Electric Steel Company.

Mr. Teich has worked with the Latrobe Electric Steel Company as a salesman in the Philadelphia district for three years. His promotion became effective August 1, 1950.

EARNINGS RISE IN FIRST HALF OF 1950, AUTO-LITE REPORTS

The Electric Auto-Lite Company reports consolidated net sales of $94,423,558 and net earnings of $5,187,591, or $3.47 per share, for the first six months of this year.

This compares with sales of $106,949,904 and earnings of $3,593,707, or $2.40 a share, for the like period in 1949. It was pointed out that earnings in the 1949 period were adversely affected by circumstances not under complete control of the company. These included the writing down of inventories and the non-recurrent cost of moving machinery and equipment to a new plant.

Second quarter figures showed sales at $56,936,741, approximately a 50 per cent increase over the first quarter. The difference was due largely to labor difficulties in the automotive industry during the early part of the year.

LESTER CASTINGS NAMES NEW YORK REPRESENTATIVE

Lester Castings, Inc., 3170 West 33rd St., Cleveland, Ohio, announces the appointment of Ernest F. Karbe as sales representative and service engineer for the state of New York. This appointment is part of an expanding program of field engineering service by Lester Castings for users of zinc and aluminum die castings.

Mr. Karbe's practical, technical background includes a number of years as superintendent of manufacturing at Curtis-Wright and works manager for Roberts-Gordon Appliance Corporation. Mr. Karbe now lives at 47 Godfrey Street, Buffalo, New York.

LITEMETAL DICAST pioneered in the development of a special modification of the famous Jubbins ALMAG aluminum alloys for die casting. They can now be offered to the metal using industry for many applications where malleable iron was formerly required. For example: The extension ladder lock illustrated was originally a malleable iron part. It was rough in appearance, streaked the ladders with rust, and required individual fitting of parts. The new LITEMETAL ALMAG die cast locks are neat, precise and rust-proof. Their excellent toughness provides a generous safety factor for the rough usage that ladders get in service.

ALMAG is tough, has high tensile strength—is not brittle. It is designed to do the job where toughness, durability and economy is required.

In addition, ALMAG is more corrosion resistant than other alloys usually used for die casting. This factor makes it highly desirable for the manufacture of lightweight marine fittings.

Die casting with these new light metal alloys offers to manufacturers greater opportunities to lower production costs and the weight of their products. Also, these metals allow more freedom of design and offer greater scope in carrying out the designers' ideas. In addition, these die castings save many man-hours of finishing time.

LITEMETAL DICAST, INC. is an organization of specialists—men thoroughly experienced in the casting and machining of magnesium and aluminum alloys—the new metals of structural design.

Write today for literature and design information.

Quick action on inquiries.

LITEMETAL DICAST Inc.

A DIVISION OF HAYES INDUSTRIES

1925 WILDWOOD AVE · JACKSON, MICHIGAN

PLANT AND EXECUTIVE OFFICES

LITEMETAL DICAST INCREASES PRODUCTION CAPACITY 50 PER CENT

Installation of new casting and melting departments by Litemetal Dicast, Inc., of Jackson, Michigan, will increase the company's production capacity by 50 percent, according to a recent announcement.

The company specializes in the die casting of magnesium and aluminum, producing parts for companies in the electrical, home appliance, textile machinery, business machine, aircraft, automotive and related fields.

Management staff consists of Robert Cornell, president, in charge of sales and engineering, and William Kavanaugh, vice president in charge of production.

Under current conditions, aircraft and military work represents an increasing proportion of the company's output.

GEORGE GIBBONS, ALCOA DIRECTOR, DIES AT 71

George R. Gibbons, one of the pioneers in the development of the aluminum industry, and a director of Aluminum Company of America, died September 3 at West Penn Hospital in Pittsburgh. He was 71 years old.

Mr. Gibbons, who retired as senior vice president of Alcoa on January 1, 1949, began his career with the company in 1901 as a chemist at the plant in New Kensington, Pa. Later he became paymaster and chief clerk for the New Kensington plant. He was transferred to the sales department and in 1906 became director of sales promotion for the company.

Four years later, in 1910, at the age of thirty-one, he was elected secretary of the company and a year later was made a vice president. He was appointed director of sales in 1928 and was promoted to senior vice president in 1931, at the same time continuing as secretary of the company until 1944.

SPECIFY FEDERAL
AND BE SURE OF SATISFACTION!
ACCURACY · COMPLEXITY
STRENGTH · ECONOMY
Zinc and Aluminum
DIE CASTINGS
Target Pistol with three Federal Castings
Loudspeaker Horn
TOOLED by FEDERAL
Projector Gear Hsg.
Gear Case Wgt. 15 lbs. 9" Blower Wheel
Why Federal?
MORE than 30 years of "know-how" a sound organization, your assurance of first grade workmanship at minimum costs.
Complete Facilities
High Pressure Water Hydraulic Injection For GREATER DENSITY BETTER FINISH
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PHONE ARMITAGE 6-4805

FINISHING MAGNESIUM

(Continued from Page 60)

pigment must show little or no attack on the metal. The pigment should be of such a type that it will inhibit corrosion of the magnesium. The vehicle should be inert, have good adhesive qualities and have a high degree of imperviousness to moisture. Primers of the glyceryl-phthalate-zinc chromate type are widely used. Baking or forced drying of the primer improves adhesion, resistance to abrasion, and also speeds up production.

Adequate priming should be followed by compatible finishing systems. In general, present day production methods require quick drying lacquer or synthetic resin formulations rather than oil type paints. Lacquers satisfactory for magnesium include formulations built around cellulose compounds, such as nitro and ethyl cellulose and cellulose acetate.

Synthetic type vehicles used on

magnesium include a wide range of one or more of the straight synthetic resins or oil modifications of the resins. Satisfactory enamels and varnishes based on such resins are available. These include phenol formaldehyde, alkyd, methacrylate, vinyl chloride, urea formaldehyde and other finishes.

The imperviousness of the top coat to moisture is substantially increased when aluminum pigments are used. The requirements[15] for a good top coat are: (1) Inertness; (2) Compatibility with the primer; (3) Impermeability; (4) Durability and weather resistance.

Another point that the the production man should consider is adaptability to the conditions and to the finishing equipment available. According to recommendations of the Dow Chemical Company, a primer coating should be applied in a thin coat averaging one-half mil (0.0005) in thickness. In some cases, to insure complete coverage and maximum inhibitive value, it may be desirable to use two coats of primer to total an average primer thickness of one mil. It is generally considered that one mil (0.001) constitutes an outside coat of paint applied to magnesium parts.

In cases where the nature of the material requires that less than one mil be applied in one application, multiple applications should be given until a full coat thickness of one mil is obtained. Certain baking type paint systems have shown good adhesion to bare metal and are particularly adapted to finishing of large quantities of die castings which are to be used for normal indoor exposure.

A large number of special finishes are available for use on magnesium articles. Black japan and color coats are used for various kinds of product finishing. These materials are available in different lusters varying from flat to high gloss. Baked enamels should be applied over approved baking type primers.

Rapid finishing, excellent adhesion, maximum imperviousness, and good wear resistance are some of the advantages of baked systems. The baking of finishes on magnesium alloys may be carried out in ovens or by means of infrared lamps. Many novelty finishes are self-performing and yield crystallized, cracked, checked, mother-of-pearl, leather, hammered metal or wrinkled effects.

Editor's Note: For detailed study of electroplating on magnesium, see Die Castings, Oct. 1948, page 43.

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[1]DeLong, Proc. Am. Electroplaters' Soc. (1949).

[2]"Finishing Magnesium" — The Dow Chemical Co., Midland, Mich.

[3]*Modern Metals* (August, 1948); *Plating* (Sept., 1948), (June, 1950); *Materials & Methods* (June, 1947).

[4]Uhlig, CORROSION HANDBOOK, p. 864—Sponsored by The Electrochemical Society and published by John Wiley & Sons. (1948).

[5]Bulletin No. DM8c. The Dow Chemical Co., Midland, Mich.

[6]Bulletin No. DM12—The Dow Chemical Co., Midland, Mich.

[7]Bulletin No. DM 1034 — The Dow Chemical Co., Midland, Mich.

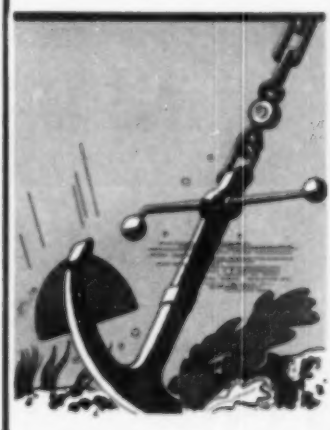
[8]Diggin and Faulks, Metal Finishing Guidebook Directory—p. 344 (1949).

[9]Bulletin No. DM 35a — The Dow Chemical Co.

[10]Bleiwais & Fuson, Metals & Alloys (Feb. 1941).

[11]Bulletin No. DM 108 — The Dow Chemical Co.

Procurement of **ZINC ALLOY DIE CASTINGS** should be Anchored Deep to the **CERTIFIED ZINC Alloy Plan**



of

The American Die Casting Institute, Inc.

(See Advertisement on page 13 of this issue)

We are proud of our membership in this Plan which assures purchasers of obtaining zinc die castings manufactured in a plant maintaining proper alloy control.

UNION DIE CASTING CO., Ltd.

2313 East 51st St. Los Angeles 58, Cal.

MEMBER OF AMERICAN DIE CASTING INSTITUTE

ZAMAK
ZINC BASE
DIE CAST ALLOYS

You're sure of Quality and Service

Specify "Certified" for High Quality . . .
Laboratory Controlled Zinc Alloy.

Certified Alloys Co.
BEDFORD, OHIO

DIE CASTING MACHINES

(Continued from Page 42)

tor mechanism connected with leverage to the toggle links can be used for imparting the first easing action to start the movement of such castings from their cavities. It is also possible to use this same mechanism for withdrawing ejector pins before the die closes, when side core pins tend to interfere in the cavity with the ejector pins.

To permit easier setting of dies, an inching valve can usually be provided for slowly moving the movable die platen into a closed position. Another adjustable restriction valve is often put into the return line of the hydraulic cylinder operating the plunger. This permits a slow return of the plunger which, on gooseneck machines tends to suck back molten metal from the nozzle eliminating drip along the sprue hole in the stationary die.

(To be concluded in the November issue.)

LITERATURE AND SERVICES

(Continued from Page 10)

A-22. DETROIT POWER SCREWDRIVER CO. The company offers two catalogs on how to save time in assembly work. The first contains illustrations and descriptions of a new power nut driver that eliminates manual handling of nuts, while the second covers the company's line of magazine-fed, power-driven screwdrivers.

A-23. PARKER-KALON CORP. How to cut assembly costs and time by using Parker-Kalon fastening devices, including self-tapping screws, on die castings is explained in a new folder, Form 449.

A-24. GREER HYDRAULICS, INC. Greer Accumulators, some of which are designed for use on die casting machinery, are described in detail in the company's Bulletin 300.

A-25. LITEMETAL DIECAST, INC. Literature and design information on aluminum and magnesium die castings are available.

A-26. NEW HOLLAND MACHINE CO. An illustrated 4-page folder describing their line of dryers for plated or lacquered parts is available from the company.

A-27. HELI-COIL CORP. How to simplify design and effect economies in die castings by using the company's screw thread inserts is explained in Bulletin 650-Design and Specification Data.

A-28. CHEMICAL CORP. The company offers literature on Lustor-on Utility-15, a process cold dip for zinc die castings. Samples will be dipped with no obligation on the sender's part.

A-29. NEWTON-NEW HAVEN CO. "How to Dimension Prints for Die Castings" is the title of a booklet offered by the company. The booklet contains step-by-step illustrated details on the proper dimensioning of die casting blue prints.

OFFER COMPLETE PRODUCT ENGINEERING SERVICE

A complete engineering and product development service has been organized by the United Development Corporation of Akron, Ohio. The service consists of helping manufacturers in the search for and development of new processes and products from the idea stage through production, according to an announcement.

The staff of United Development includes engineers who have worked on projects for many well-known concerns including Frigidaire, Jack and Heintz, Sunray Stove Company, Vitreous Steel Products Co., Goodyear Aircraft Corp., and Delta Electric Co.

FREQUENT DESIGN CHANGES

(Continued from Page 26)

closeup photograph showing the way in which front and rear covers are keyed to the gear housing to locate them in correct radial position.

If the die parting were to fall at the inner surface so that the shoulder would need to be machined, this important radial key could not be obtained.

Machined dimensions vs. cast dimensions. One of the most attractive features of the die casting process is the ability to cast parts accurately. It is frequently possible to hold finish dimensions in the die and thus completely eliminate machining. There is, however, a point at which it becomes more practical and economical to drill or ream a hole, or mill a surface

ALUMINUM DIE CASTING ALLOYS

You're sure of Quality and Service

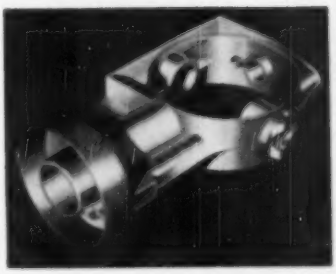
Fully Equipped to Serve you Promptly with All Aluminum Die Cast Alloys.

ALUMINUM SMELTING & REFINING CO., INC.

BEDFORD, OHIO

"It's a Fact!"

DESIGNING FOR DIE CASTING? — START WITH A HOLE



The design of a die casting starts with a consideration of the required holes and openings. These, in turn, must be surrounded with a minimum of metal consistent with the requirements of appearance, strength and the needs of the die caster for proper draft and tolerance.

Lowest cost can be obtained by designing so as to simplify die construction and promote practical casting and finishing operations. The die cast aluminum Wringer Head at left is a good example.

We will be glad to work closely with you toward the solution of similar problems.

OLDEST DIE CASTERS IN UPPER MIDWEST

Licensed Producer

Certified Zinc Die Casting Plan

TWIN CITY DIE CASTINGS COMPANY

Minneapolis 14, Minnesota

We can offer zinc die castings
as small as .000004 of a lb. (250,000 to the lb.)

—SMALLNESS UNLIMITED!

GRC's method of die casting **really small** parts has opened up new fields in designs, products and economies for hundreds of manufacturers. Our exclusive, high-speed mass production facilities turn out simple or intricate parts automatically—completely trimmed ready for use—100,000 pieces to many millions. Discover GRC's small parts possibilities for yourself—

Write *Today* for Bulletin and Samples

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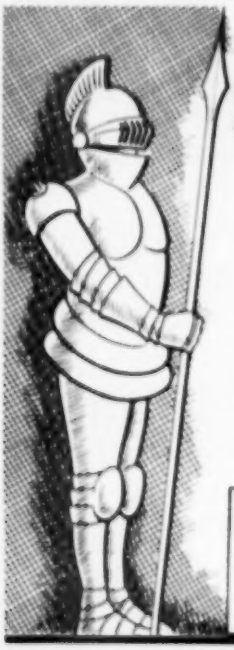
Maximum Weight: ½ oz.
Maximum Length: 2 in.
Smallness Unlimited



Fortify Your PRODUCTION WITH *Fort* CASTINGS

Careful attention to your production requirements is a cardinal rule at **Fort** Die Casting Corporation. You are assured of accuracy in meeting your specifications, controlled quality of metal and speedy delivery of the finished castings. In addition, **Fort** Engineers will be glad to assist you in adapting your designs to take full advantage of the quality and economy of the die casting process.

Call or write **FORT** Die Casting Corporation for competent engineering advice on the use of die castings in your production.

ALUMINUM-ZINC-LEAD CASTINGS

"Certified Analysis Alloys"

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than to attempt to die cast it to finish dimension. The advantage of the die casting here lies in the fact that the amount of metal removal is small and the machining operation rapid.

This factor has been recognized, as indicated in Figures 5 and 6 which are drawings of the same part. Figure 5 contains several dimensions as cast, and Figure 6 shows the machined dimensions.

For example, the hole in the base which receives a pressed in sintered bearing, is cored to 11/32", allowing for standard draft taper. This hole is subsequently reamed to .375/.376. Since it is necessary to allow extra stock for a taper so that the core can be withdrawn, no attempt has been made to approach finish dimension on the hole. One reaming cut removes the metal which has been left inside the hole.

All holes in the top surface are drilled because the cumulative tolerances are too close and the hole diameters too small to recommend coring. Reference to Figure 6 will reveal four closely dimensioned diameters in relative locations with tolerances of .001 to .008.

Protecting Aluminum Castings from Corrosive Attack

As has been mentioned, all the aluminum die castings are treated anodically to create an oxide film on the surfaces. This is an inert, hard aluminum oxide which not only resists corrosion, but also increases abrasion resistance.

The anodizing process followed for these castings is as follows: After degreasing, the castings are immersed in a sulphuric acid solution and made the anode with a voltage of approximately 20 volts. This treatment produces a porous film of aluminum oxide in about 25 minutes. Castings are then immersed in a 200F solution of potassium dichromate which solidifies the aluminum oxide film. The castings are then washed in hot water.

24 WAYS . . .

(Continued from Page 18)

That die casting is often truly competitive with all the processes reviewed above is shown by the many conversions from one or other of them that are recorded from time to time in this magazine. By utilizing the full potentialities of the die casting process it is frequently possible not only to effect a conversion that shows production economies, but by redesign to produce an article even better suited to the functions that it has to carry out than was the original.

More sand cast products are converted to die casting than any others, and this reflects the relatively extensive machining operations that are usually needed to prepare a sand casting for service. Many sand castings have to be machined all over, inside and out, but the greater accuracy and good as-cast finish of die castings mostly allow much of this machining to be eliminated.

Further, the greater strength of die castings as compared with sand cast parts in the same alloy usually permits some weight saving, so reducing material cost and shipping charges while retaining an adequate safety factor. There are often good reasons, however, for producing a die casting from a metal other than that used for the original sand casting.

NATIONAL METAL SHOW

(Continued from Page 45)

ELGIN NATIONAL WATCH CO.
Booth 318

CLAUD S. GORDON COMPANY
Booth 920

YOU WILL SEE: Industrial furnaces and ovens, metallurgical testing machines, temperature control instruments and thermocouples and accessories.

YOU WILL MEET: Claud S. Gordon, president; Vincent Manka, vice president; I. M. Larson, secretary; D. E. Howell, chief engineer; W. H. Hammond; F. C. Collins; J. D. Joyce; H. D. Burnside; F. C. Mackey.

HAYNES STELLITE DIVISION
(Div. Union Carbide & Carbon Corp.)

Booths 901, 1001, and 1101

YOU WILL SEE: Live demonstration of mechanized hard-facing by the oxy-acetylene process; plastic patterns for precision investment casting; hard-facing materials; metal cutting tools; corrosion resistant alloys and high temperature alloys.

HELI-COIL CORPORATION
Booth 2442

YOU WILL SEE: Heli-Coil screw thread inserts to provide life-time thread for all threaded holes. Inserts of stainless steel and phosphor bronze will be displayed.

YOU WILL MEET: Edward Baruch, vice-president; Harkness W. Cram, sales manager; Howard Hass, service manager; Joe Paluseo and S. W. Anderson.

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Booth 728

YOU WILL SEE: New type fast quenching oil; electric salt bath furnaces for pre-heating and martempering; case studies involving Houghton's cutting oils, drawing compounds, rust preventives and heat treating salts.

YOU WILL MEET: D. J. Richards, vice president, sales; A. A. Miller, sales manager Chicago Div.; James McElgin; J. C. Rovaldi; D. C. Miner; E. G. Irwin; Reese Nelson; W. McManus; F. L. Townsend; R. M. Gerling; C. C. Gaynes; A. J. Andre; D. R. Richards, Jr.; C. S. LaTour; F. J. Colligan.

FISHER FURNACE DIVISION
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Booth 1204

MANHATTAN RUBBER DIVISION
(Div. Raybestos-Manhattan, Inc.)
Booth 2130

YOU WILL SEE: Manhattan reinforced foundry cut-off wheels in operation on a Tabor foundry cut-off machine; portable grinder demonstrations with Manhattan Moldisc for notching risers and trimming fins; an exhibit of rubber and resinoid bonded grinding wheels and a special display of diamond wheels for grinding cemented carbides.

YOU WILL MEET: W. H. Steinberg, sales manager; L. S. Hilton, assistant sales manager; F. E. Tiemann, district manager; H. Ahlers; C. M. Fleming; D. C. Gilley; E. E. Marlowe; Alex Watchorn; E. G. Wilks and O. G. Harris.

THE NEW JERSEY ZINC CO.
Booth 2103

YOU WILL SEE: A wide variety of zinc die castings which represent the best in current die casting design. In most cases, the finished products in which the die castings are used are also exhibited. Other highspots: a special display of ordnance die castings; an actual die casting die together with a gate of castings from that die; and a panel showing the variety of organic and electroplated finishes which can be applied on zinc die castings.

YOU WILL MEET: R. G. Kenly, assistant sales manager; E. H. Klein, manager Metal Div.; R. Davison, manager Market Development Div.; C. R. Maxon; R. E. Kellers; D. C.

Bradley; D. P. Brannin; J. S. Gollbran, Jr.; R. F. Burns; E. K. Vaughn, and R. A. Jacobson.

OAKITE PRODUCTS, INC.
Booth 322

THE OSBORN MANUFACTURING COMPANY
Booth 319

YOU WILL SEE: A new gear deburring method using a semi-automatic universal work piece holder and brushing lathe; a complete line of power and maintenance brushes.

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OSBORN MANUFACTURING COMPANY
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OAKITE PRODUCTS, INCORPORATED
Booth 322

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YOU WILL MEET: F. J. McNally, Chicago Division manager assisted by main office engineers and metal specialists.

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Booth 2560

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YOU WILL MEET: Victor F. Stine, vice-president; B. H. Marks, manager Hydro-Finish Div.; Leonard W. Wagner, Chicago district manager; Frank Newell; R. W. Gostard; A. Lesley Gardner, advertising manager.

PARK CHEMICAL COMPANY
Booth 1202

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Booth 1715

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Booth 1211

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Booth 518

STANDARD ELECTRICAL TOOL COMPANY
Booth 2102

YOU WILL SEE: Representative tools from the company's line of grinders and buffing and polishing lathes. Also featured will be twin-wheel, wet or dry tool grinders.

YOU WILL MEET: W. A. Ferguson, sales manager; J. J. Klopp; P. P. Wagener; F. W. Jenike, and A. E. Danow.

SURFACE COMBUSTION CORP.
Booth 1106

YOU WILL SEE: MRX Atmosphere Generator and a line of equipment used in heat treating operations.

YOU WILL MEET: F. H. Adams, president; C. B. Phillips and W. M. Hepburn, vice-presidents; E. G. deCoriolis, director of research; H. M. Heyn, sales manager of Heat Treat Division; A. H. Koch, sales manager, Standard Heat Treat Division; and R. W. Elmenthaler, liaison engineer.

TEMPIL CORPORATION
Booth 515

YOU WILL SEE: Tempil pellets for indicating temperatures at high heat levels and in reducing atmospheres; Tempilaq, liquid temperature indicator. Both materials will be available for the first time in the 1600° to 1910°F range.

TINNERMAN PRODUCTS, INC.
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UDYLITE CORPORATION
Booth 907

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WHEELCO INSTRUMENT CO.
Booth 1909

YOU WILL SEE: The new Pneumatic Capacilog Strip Chart Recorder and the new 1300 series Flameotrol Combustion Safeguard, along with thermometers, pyrometers and potentiometers.

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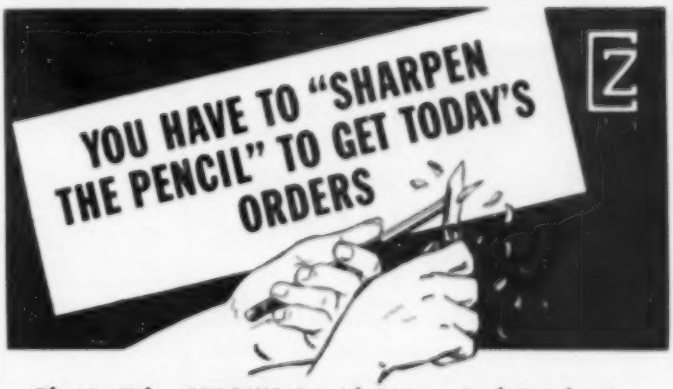

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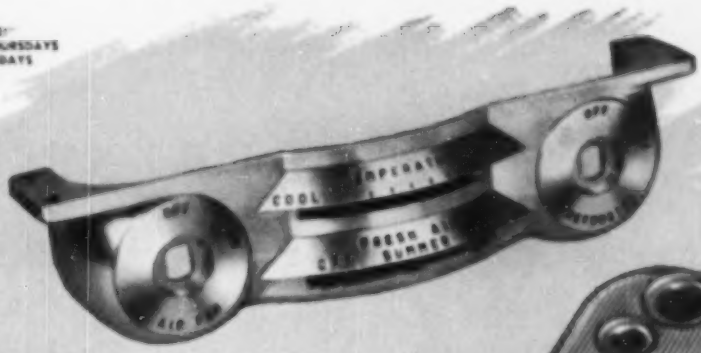

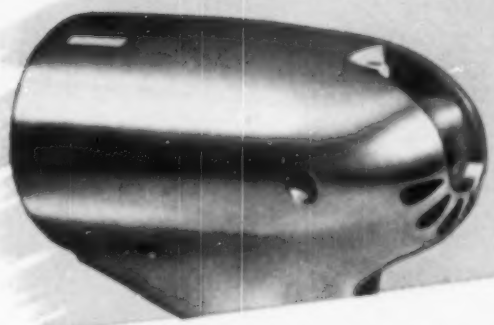

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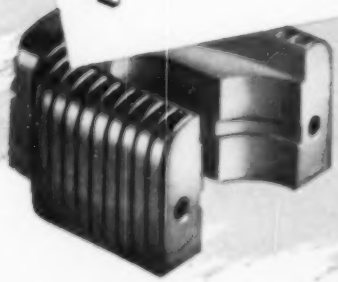

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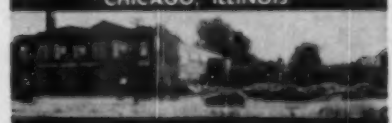

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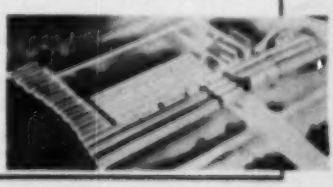

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